BUREAU OF WATER

SC NONPOINT SOURCE MANAGEMENT PROGRAM

1999 Update

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South Carolina Department of Health and Environmental Control

SOUTH CAROLINA
NONPOINT SOURCE MANAGEMENT PROGRAM
1999 UPDATE

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EXECUTIVE SUMMARY

Nonpoint Source (NPS) water pollution generally comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria containing waste from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest water body or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries and wetlands. Nonpoint source pollution may also impact groundwaters when it is allowed to seep or percolate into aquifers. The adverse effects of NPS pollution include physical destruction of aquatic habitat, fish die-offs, interference with or elimination of recreational uses of a water body (particularly lakes), closure of shellfish beds, reduced water supply or taste and odor problems in drinking water, and increased potential for flooding because water bodies become choked with sediment.

In South Carolina, nonpoint sources of pollution are at least partially responsible for water quality degradation in streams, lakes, and estuaries. As much as 43 percent of the streams and rivers, 7 percent of lakes, and 23 percent of the coastal waters are impaired by one or more NPS categories. Further, NPS pollution is responsible for closures or restrictions to 70 percent of shellfish harvesting waters. Clearly, a program focused on managing NPS is needed to protect and enhance water quality in South Carolina.

The *South Carolina Nonpoint Source Management Program Update* outlines the state's strategic plan for addressing statewide water quality impairments attributable to nonpoint source pollution discharges. To accomplish this strategy, 17 long-term goals for reducing or preventing NPS pollution are enumerated. Throughout the document, five-year action strategies are described that lead to attainment of the long-term goals, and annual milestones leading to attainment of the action strategies are further described. The Program is two-pronged; focusing on reducing NPS impacts in priority watersheds, and implementing activities statewide in order to prevent NPS pollution. Components include both regulatory and voluntary approaches.

To facilitate success in achieving water quality improvements, South Carolina's NPS program focuses federal Clean Water Act Section 319 and state resources upon impaired 303(d) listed waterbodies in priority watersheds identified through the Unified Watershed Process. The state's Coastal Nonpoint Pollution Control Program under federal Coastal Zone Management legislation is also implemented.

Nine categories of NPS pollution that impact South Carolina's waters are identified and described: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic modification, wetlands disturbance, land disposal/groundwater impacts, and atmospheric deposition. Technology based controls, or management measures, are employed to address these categorical impacts. The Program describes specific management measures for each category as well as implementation schedules. South Carolina has the legal authority to implement all of the necessary management measures.

The South Carolina Department of Health and Environmental Control is responsible for Program implementation, but is dependent upon the cooperation of all levels of government, private sector stakeholders, and especially the citizens of the State in order to realize positive results. Many organizations have expertise that can be beneficial to the NPS pollution management program. For example, trade and environmental organizations have program delivery mechanisms that reach persons capable of implementing NPS controls, e.g., farmers, contractors, mine operators, and homeowners. These partnership roles are described in the program.

A system of evaluation/monitoring techniques is a necessary component of the NPS Management Program, in order to judge its progress and success. Evaluation will show whether the Program is attaining the state's overall water quality vision, stated long-term goals, and five-year action strategies. In South Carolina, several monitoring and tracking efforts are described that address available information on improvements in water quality, implementation milestones, and available information on reductions in NPS pollution. Evaluation techniques include water quality monitoring, management measure implementation, and stakeholder feedback.

This *South Carolina NPS Management Program Update* fulfills the requirements of both Section 319 of the Clean Water Act Amendments of 1987, and Section 6217 of the CZARA of 1990. It comprehensively describes a framework for agency coordination and cooperation and serves to implement a strategy for employing effective management measures and programs to control NPS pollution statewide for the next five years.

It incorporates nine key elements that are iterated in Environmental Protection Agency NPS guidance. Through the use of a framework that addresses these key elements, South Carolina will continue to have an effective NPS program that is designed to achieve and maintain beneficial uses of water.

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CHAPTER 1. INTRODUCTION

a. Background

The earth has a phenomenal amount of water, approximately 1.4 quintillion cubic meters of it. Yet, less than 1 percent of that is fresh, usable water. The oceans, glaciers, and ice caps account for more than 99 percent of all water on earth. That remaining small fraction accounts for every cloud, river, lake, pond, swamp, and aquifer. Of that, more than two-thirds is groundwater.

In South Carolina, and everywhere else, clean water is essential for the survival of life. People need it for drinking, bathing, cleaning, and recreating. Industry needs it to manufacture their products. Farmers and gardeners have to have it to raise crops. Fish live in it, and other animals depend on it for their survival.

Unfortunately, as much as 40 percent of the nation's waterways, recently assessed by states, are still unsafe for designated uses (drinking, swimming, fishing, irrigating, etc.) The majority of the current water quality impairments in our rivers, streams, lakes, estuaries, and wetlands result from nonpoint source (NPS) pollution and other sources such as urban stormwater discharges. Pollution from factories and municipal sewage treatment plants (point sources) has been dramatically reduced over the last 25 years, but runoff from urban, rural, and other areas continues to put clean water at risk.

NPS water pollution, sometimes called "runoff pollution" or "polluted runoff" does not result from a discharge at a specific, single location (or point), but generally comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria containing waste from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest waterbody or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries and wetlands. Nonpoint source pollution may also impact groundwater when it is allowed to seep or percolate into aquifers.

The adverse effects of NPS pollution include physical destruction of aquatic habitat, fish die-offs, interference with or elimination of recreational uses of a waterbody (particularly lakes), closure of shellfish beds, reduced water supply or taste and odor problems in drinking water, and increased potential for flooding because waterbodies become choked with sediment.

The impact of nonpoint source pollution on the waters of South Carolina mirrors that of the nation as a whole. The ***Statewide Water Quality Assessment Pursuant to Section 305(b) of the Clean Water Act*** (CWA), provides a comprehensive analysis of the quality of the water resources of the state. It provides a summary of classified use support of waters statewide as well as descriptions of water related programs implemented by the South Carolina Department of Health and Environmental Control (SCDHEC). The reader is invited to review this document which is available from the SCDHEC Bureau of Water and appears on the SCDHEC Home Page. It is published bi-annually and will next be available around March, 2000. In South Carolina, nonpoint sources of pollution are at least partially responsible for water quality degradation in streams, lakes, and estuaries. Of the 19,487 river miles that were assessed via SCDHEC water quality monitoring stations, 5400 miles, or 28 percent, were impaired by one or more NPS categories. When unknown sources of impairments were included, the percentage rose to 43

percent. Of the 211,461 lake acres that were assessed for the report, 15,650 acres, or 7.4 percent, were impaired by NPS. South Carolina also has approximately 221 square miles of assessed estuaries. Of those, nonpoint sources of pollution were the contributing factor to water quality problems of 32 square miles, 50 square miles (23 percent) if unknown sources are included. Also assessed were 631,589 acres of coastal waters classified for shellfish growing, of which 206,254 were either restricted or closed to harvesting. NPS pollution was responsible for closures or restrictions to 144,331 acres, or 70 percent of those waters. These conclusions are based on use support criteria for which the state has numerical standards, namely dissolved oxygen, fecal coliform bacteria, and toxicants. Some pollutants, for example nutrients and sediment, that are known to contribute to NPS water quality problems, are not included in the database. Clearly, a program focused on managing NPS is needed to protect the water resources in South Carolina.

Congress recognized the growing problem of diffuse sources of pollution in the late 1980s, and added NPS provisions to the federal law. The Clean Water Act of 1987 (CWA) states: **"It is the national policy that programs for the control of NPS pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and NPS."** This legislation focuses on the importance of controlling NPS water pollution. With the enactment of Section 319 of the CWA, new direction and significant federal financial assistance for the implementation of state NPS programs was authorized. The CWA required two major reports to be completed by each state, an NPS Assessment Report and an NPS Management Program.

In the fall of 1987, SCDHEC, the agency responsible for water pollution control in South Carolina, applied for and received U.S. Environmental Protection Agency (EPA) funds to commence this expanded NPS effort. The first phase of this effort involved the preparation of ***Assessment of NPS Pollution for the State of SC*** that described then existing and potential NPS problems. The report identified over 300 waterbodies that were believed to be impacted or potentially impacted by NPS pollution. It included the water quality problems associated with the impact such as nutrients, toxic materials, or bacterial contamination, and the source (or category) of the impact such as agricultural or urban stormwater runoff.

The second phase of the initial NPS effort produced the *SC NPS Management Program* document in 1989. It described the state's strategy for addressing the NPS problems described in the NPS Assessment. This program met the requirements of Section 319 of the CWA and EPA's accompanying guidance. A four-year plan (1989-92) to address NPS pollution through education, technical assistance, demonstration projects, monitoring efforts and regulatory programs was outlined in the Program. It was approved by the EPA in 1990.

In November of the same year, Congress enacted the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). These Amendments were intended to address several concerns, a major one of which is the impact of NPS pollution on coastal waters. To address more specifically the impacts of NPS pollution on coastal water quality, Congress also enacted Section 6217, "Protecting Coastal Waters," which was codified as 16 U.S.C. Section 1455b. This Section mandated that each state with an approved coastal zone management program develop and submit to EPA and the National Oceanic and Atmospheric Administration (NOAA) for approval a Coastal Nonpoint Pollution Control Program (CNPCP). The purpose of the Program as stated in the statute "shall be to develop and implement management measures for NPS pollution to restore and protect coastal waters, working in close conjunction with other state and local authorities." South Carolina's CNPCP was merged with the statewide NPS management program and described in the ***South Carolina Nonpoint Source***

Management Program (1995).Currently, the CNPCP has been approved with conditions by NOAA and EPA and steps are being taken to bring this program to full approval status. Implementation is underway within the state's coastal watersheds.

b. Purpose of Update

This ***South Carolina NPS Management Program Update (1999)*** fulfills certain requirements of both Section 319 of the Clean Water Act Amendments of 1987, and Section 6217 of the CZARA of 1990. It comprehensively describes a framework for agency coordination and cooperation and serves to implement a strategy for employing effective management measures and programs to control NPS pollution statewide. Further, it incorporates nine key elements that are iterated in EPA NPS guidance. Through the use of a framework that addresses these key elements, South Carolina will continue to have an effective NPS program that is designed to achieve and maintain beneficial uses of water.

South Carolina's Program is a cooperative effort, with the SCDHEC Bureau of Water taking the lead for Management Program development, implementation of certain components, and water quality assessment. Other areas within SCDHEC and other agencies and organizations will assist in Program implementation.

South Carolina strives to effectively implement its NPS program. By incorporating various components and elements into the NPS Management Program Strategy so as to successfully address the nine key elements, the state aims to achieve "enhanced benefit status" from EPA. Benefits of this status include priority for multi-year grant work plans, streamlined review of grant applications by EPA, increased technical assistance, reduced reporting requirements, and reduced EPA oversight.

The NPS Program described in this *South Carolina NPS Management Program Update (1999)* document amends the previous NPS Management Program Update of October 1995. It covers the 5-year period 1999-2003.

c. Vision Statement

The vision for South Carolina's NPS management program is founded in the mission statement adopted by the SCDHEC and the Department's Bureau of Water:

"We promote and protect the health of the public and the environment."

SCDHEC

"Our mission is to ensure that all water resources of South Carolina are of a quality suitable for use by all citizens and that all surface waters are of a quality suitable to support and maintain aquatic flora and fauna."

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To help accomplish this mission, the NPS management program will be employed as a tool to control, prevent, and remediate NPS water pollution in an efficient and effective manner.

CHAPTER 2
NINE KEY ELEMENTS

a. Nine Key Elements Explained

Late in 1996, the EPA issued national NPS Section 319 guidance which contained specific requirements and instructions for updating State NPS Management Programs. This guidance described nine key elements for effective management of NPS pollution. State Programs must incorporate these elements into management program updates, and then be approved by EPA, in order to remain eligible for continuing Section 319 funding. Given below is a synopsis of how the South Carolina NPS Management Program addresses each of the nine key elements. Section b describes these elements more specifically and references other sections of this document for details.

1. The state program contains explicit short-term and long-term goals, objectives and strategies to protect surface and groundwater.

The SC NPS Management Program has established long-term and short-term goals and objectives for protection of the waters of the state. Management measures have been outlined by category and action plans have been developed outlining significant steps that will be taken during the next five years toward meeting the goals and objectives. South Carolina will continually monitor both environmental and water quality as an evaluation of the NPS Management Program for effectiveness in reaching the goals and objectives.

2. The state strengthens its working partnerships and linkages to appropriate state, interstate, tribal, regional and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.

The SC NPS Program is implemented with the coordinated efforts of NPS cooperating agencies (partners) and stakeholders. The NPS Task Force consists of representatives of state and federal agencies and stakeholder groups with resource management roles.

3. The state uses a balanced approach that emphasizes both statewide NPS programs and on-the-ground management of individual watersheds where waters are impaired or threatened.

SC has identified five top priority watersheds for on-the-ground implementation through the Unified Watershed Assessment and Watershed Restoration Action Strategy process. Comprehensive projects are being implemented within these priority watersheds. Included are BMP implementation, assessments, TMDL development, and evaluation and tracking.

In addition to the priority watershed program, SC has a statewide program and strategy that includes voluntary approaches such as outreach and education, technology transfer, assessment, etc., and enforceable mechanisms to control many NPS related activities.

4. The state program abates known water quality impairments from NPS pollution and prevents significant threats to water quality from present and future NPS pollution activities.

South Carolina's NPS Management Program is directed at abatement of known water quality problems. NPS categorical programs are in place that address significant threats from existing NPS activities and sources. The SC NPS Program is continually reviewed so that it can be modified to address new problems that may arise.

5. The state NPS Program identifies waters and their watersheds impaired by NPS pollution and identifies important unimpaired waters that are threatened or otherwise at risk. Further, the state NPS Program establishes a process to progressively address these waters by conducting more detailed watershed assessments and developing watershed implementation plans followed by implementation.

South Carolina's Section 305(b) Water Quality Assessment and 303(d) List delineate waters in the state not supporting all designated uses and identifies the most likely pollution source category for the impairment. The state uses this information as a guide in developing strategies and prioritizing watersheds for implementation.

6. The state reviews, upgrades, and implements all program components required by Section 319 of the Clean Water Act, and establishes flexible, targeted, and iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable. The state program includes:

- A mix of water quality-based and/or technology-based programs designed to achieve and maintain beneficial uses of water and,

- A mix of regulatory, non-regulatory, financial and technical assistance as needed to achieve and maintain beneficial uses of water as expeditiously as practicable.

Regulatory, voluntary, financial assistance, technical assistance, information/education and public awareness programs are identified for each category of NPS pollution in the categorical action plans.

7. The state NPS Program identifies federal lands and activities which are not managed consistently with state NPS Program objectives. Where appropriate, the state seeks EPA assistance to help resolve issues.

South Carolina has set up a comprehensive federal consistency review program to assure that federal programs and/or activities in the state are consistent with the goals of the NPS Management Program. The state will work cooperatively with each federal agency to assure that the program/activity complies. We do not anticipate that any non-resolvable issues exist. However, if such issues do arise, the state will seek the assistance of EPA in resolution.

8. The state manages and implements its NPS program efficiently and effectively, including necessary financial management.

South Carolina takes full advantage of the capabilities of the Grants Reporting Tracking System (GRTS) to track the grant/project period. The state provides clear written guidance to cooperators on applying for grants and reporting instructions to cooperators on grant agreement reporting. The state complies with grant requirements. The state is timely with applications and work plans. The state expends its grant funds in a timely manner, including executing grant agreemenmts within three months. And, the state does not regularly have grants that have been expired for three months without closeout.

9. The state periodically reviews and evaluates its NPS management program using environmental and functional measures of success, and revises its NPS assessment and its management program at least every five years.

South Carolina has established appropriate measures of progress in meeting its programmatic and environmental goals and objectives. The state implements a monitoring/evaluation strategy with appropriate indicators, and a schedule to measure success in meeting goals and objectives. The NPS Management Program contains a feedback loop to periodically review and assess its progress, and revises its program as appropriate in light of the review.

b. Nine Key Elements Index of Implementation for South Carolina

1. The state program contains explicit short-term and long-term goals, objectives, and strategies to protect surface and groundwater.

ELEMENT MILESTONE	Section(s)
A. State program includes a vision statement.	Ch. 1c
B. State has specific long-term goals that are linked to its vision and are directed towards the expeditious achievement and maintenance of beneficial uses of water.	Ch. 3b, 3e
C. State has specific short-term (e.g., 1-5 year) objectives, expressed as activities, that are linked to its goals.	Ch. 3c,d,e,g, 4h, 6h, 7a-h, 9f
D. State has identified measures and indicators that will be used to assess the state's success in achieving its goals and objectives.	Ch. 9
E. State has identified specific, expeditious milestones for its activities.	Ch. 3d,e,f, 4a,d, 5f, 7a,h
F. State has identified implementation steps and the expected effects of those steps on its water resources.	Same as C and E

2. The state strengthens its working partnerships and linkages with appropriate state, tribal, regional, and local entities (including conservation districts), private sector groups, citizens groups, and federal agencies.

A. The state uses a statewide collaborative team, NPS task force, or advisory group, or other appropriate process, to provide for input and recommendations from representatives of federal, state, and local agencies, private sector groups and citizens groups, regarding NPS program direction, project selection, and other similar aspects of program administration.	Ch. 3d, 4a, 6b, 9e
B. The task force meets regularly and promotes collaborative and inclusive decision making.	Ch. 6b, 9e
C. The state program specifies procedures to provide for periodic public review.	Ch. 3d, 6b,i, 9e
D. The state effectively incorporates a variety of organizations and interests into its implementation of NPS activities and projects.	Ch. 3d,g, 6b-6i, 9e
E. The State uses its partnerships effectively to avoid the transfer of problems among environmental media.	Same as C, D

3. The state uses a balanced approach that emphasizes both Statewide NPS programs and on-the-ground management of individual watersheds where waters are impaired and threatened.

A. Annual or multi-year work plans contain NPS implementation actions directed at both specific priority watersheds and activities of a statewide nature.	Ch. 3d,e, 4a
B. State tracks both statewide activities and watershed projects.	Ch. 8c, Ch. 9
C. State has institutionalized its program beyond the annual implementation of 319-funded activities and projects.	Entire document
D. State uses an integrated watershed approach for assessment, protection and remediation that is well integrated with other water or natural resource programs.	Ch. 3, 4, 5, 7

4. The State program (a) abates known water quality impairments from NPS pollution and (b) prevents significant threats to water quality from present and future activities.

A. State has comprehensively characterized water quality impairments and threats throughout the state which are caused or significantly contributed to by NPSs.	Ch. 3d,e,f,g, 4d, 9b
B. State has comprehensively characterized reasonably foreseeable water quality impairments and threats that are likely to be caused by NPS pollution in the future.	Same as A
C. State program addresses all significant NPS categories and subcategories.	Ch. 7 a-I
D. State program has identified specific programs to abate pollution from categories of NPSs which cause or substantially contribute to the impairments identified in its assessments.	Ch. 4, 7
E. State has identified specific programs to prevent future water quality impairments and threats that are likely to be caused by NPS pollution.	Ch.3g, 4a, 6, 17
F. Additional information:	Ch.4, 6, 7

5. The state program identifies waters and their watersheds impaired by NPS pollution and identifies important unimpaired waters that are threatened or otherwise at risk. Further, the state establishes a process to progressively address these identified waters by conducting more detailed watershed assessments and developing watershed implementation plans, and then by implementing the plans.

A. State water quality assessments (including those performed under Section 305(b), 319(a), 303(d), 314, and others), along with analysis of changing land uses within the State, form the basis for the identification of the State's planned NPS activities and projects.	Ch.3d,e,g, 4a,d, 9b,d
B. State activities focus on remediating the identified impairments and threats, and on protecting the identified at-risk waters.	Same as A
C. State has provided for public participation in the overall identification of problems to be addressed in the State program, and in the establishment of a process to progressively address these problems.	Ch.3d,f,g, 6f, 9e
D. State NPS priorities are communicated to, consistent with, and reflected in program planning and implementation activities by other water resource management agencies operating within the state.	Ch.5g,6, 7, 9b

E. State revises its identification of waters and revisits its process for progressively addressing these problems periodically (e.g., once every 5 years).	Ch.3d, 3f, 9b

6. The state reviews, upgrades, and implements all program components required by Section 319(b) of the Clean Water Act, and establishes flexible, targeted, and iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable. The state programs include: (a) A mix of water quality-based and/or technology-based programs designed to achieve and maintain beneficial uses of water; and (b) A mix of regulatory, non-regulatory, financial and technical assistance as needed to achieve and maintain beneficial uses of water as expeditiously as practicable.

A. The state includes in its program and implements the following eight items:

i. Identification of the measures to be used to control NPS pollution, focusing on those measures which will be most effective to address the specific types of NPS pollution prevalent within the state. These measures may be individually identified or presented in manuals or compendiums, provided that they are specific and are related to the category or subcategory of NPS. They may also be identified as part of a watershed approach towards achieving water quality standards, whether locally, within a watershed, or statewide;	Ch.7a-I
ii. Identification of programs to achieve implementation of the measures;	Ch.3e,4, 5, 7
iii. Processes used to coordinate and, where appropriate, integrate various programs used to implement NPS controls in the state;	Ch.3d,e,f, g, 4a,b, 6
iv. A schedule with goals, objectives, and annual milestones for program implementation; legal authorities to implement the program; available resources; and institutional relationships;	Ch.3, 7, 9
v. Attorney General certification (if program is changed substantially);	Appendix 3
vi. Sources of funding from federal (other than 319), state, local, and private sources;	Ch.4a,b,e, 7a
vii. Identification of federal programs and projects that the state will review for their effects on water quality and their consistency with the state program; and	Ch.5g
viii. Monitoring and other evaluation programs to help determine short-term and long-term program effectiveness.	Ch.9

B. The state also incorporates or cross-references existing baseline requirements established by other applicable federal or state laws to the extent that they are relevant. Examples include but are not limited to:

i. Approved state coastal NPS pollution programs required by Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA);	Ch.3e, 4b, 6f
ii. State Forest Management Practices Acts;	Ch.7b, 9c
iii. State construction, erosion or nutrient management laws; and	Ch.5b-f, 7c
iv. Federal or state transportation laws which govern construction site or maintenance runoff.	Ch.7c

7. The state identifies federal lands and activities which are not managed consistently with state NPS program objectives. Where appropriate, the state seeks EPA assistance to help resolve issues.

A. The state reviews federal financial assistance programs, development projects, and other activities that may result in NPS pollution for consistency with the state program.	Ch.5g, 6d
B. The state works with federal agencies to resolve potential inconsistencies between federal programs and activities and the state programs.	Ch.5g, 6d
C. Where the state cannot resolve federal consistency issues to its satisfaction, it requests EPA assistance to help resolve the issues.	Ch.5g,
D. The state coordinates with federal agencies to promote consistent activities and programs, and to develop and implement joint or complementary activities and programs.	Ch.5g, 6d, 7a,b

8. The state manages and implements its NPS program efficiently and effectively, including necessary financial management.

A. The state's plans for watershed projects and statewide activities are well-designed, with sufficient detail to assure effective implementation.	Ch.3d, 4a, 7
B. The state's watershed projects focus on the critical areas, and critical sources within those areas, that are contributing to NPS problems.	Same as A
C. State implements its activities and projects, including all tasks and outputs, in a timely manner.	Ch.3d, 8
D. State has established systems to assure that the state meets its reporting obligations.	Ch.8b, 8c, 9d
E. State utilizes the Grants Tracking and Reporting System effectively	Ch.8c, 9d
F. State has developed and uses a fiscal accounting system capable of tracking expenditures of both 319 funds and non-federal match.	Ch.8b
G. NPS projects include appropriate monitoring and/or environmental indicators to gauge effectiveness.	Ch.4a, 9

9. The state periodically reviews and evaluates its NPS management program using environmental and functional measures of success, and revises its NPS assessment and its management program at least every five years.

A. The state has and uses a process to periodically assess both improvements in water quality and new impairments or threats.	Ch.3d,f, 9
B. The state uses a feedback loop, based on monitoring and other evaluative information, to assess the effectiveness of the program in meeting its goals and objectives, and revises its activities and tailors its annual work plans, as appropriate, in light of its review.	Ch.3d,f, 6b, 9
C. Using its feedback loop, the state periodically reviews and assesses the goals and objectives of the NPS management program, and revises the program as appropriate in light of its review.	Ch.9
D. The state's annual report successfully portrays the state's progress in meeting milestones, implementing BMPs, and achieving water quality goals.	Ch.9f

CHAPTER 3.
SC NPS MANAGEMENT STRATEGY

a. Introduction

The state's strategy for management and abatement of NPS pollution is based on both regulatory and non-regulatory program elements. It also relies on a statewide and targeted watershed approach, as well as recommended best management practices to control pollution related to NPS activities. Certain activities that may cause NPS water pollution are regulated by the state, e.g., construction and hydromodification. The strategy for management of these activities is to continue to issue permits, certifications, etc., and to maintain programs for compliance and enforcement. Program implementation for NPS activities or categories that are not regulated will utilize a two-pronged approach (targeted watershed and statewide) and will be supported financially through federal assistance (EPA Section 319 grants, USDA programs, etc.) and state resources. The NPS Management Program targets priority watersheds for implementation of NPS mitigation projects and activities. Prioritization of these watersheds makes use of the process described in the state's Watershed Restoration Action Strategy/ Unified Watershed Assessment (WRAS/UWA). This process is described below. Within priority watersheds, activities and projects will be implemented that address NPS parameters of concern that appear on the state's 303(d) list (waters targeted for management action). The NPS Management Program also incorporates the SC Coastal Nonpoint Pollution Control Program Implementation Strategy, the SC Watershed Water Quality Management Strategy, and the state's strategy for developing and implementing NPS Total Maximum Daily Loads (TMDLs).

The NPS Management Program will also implement a strategy to address NPS on a statewide basis. Components include education/outreach, technology transfer, BMP demonstration, BMP compliance, NPS TMDL development, and assessment. The program in total has been and will continue to be implemented in cooperation with other agencies, organizations, and groups at all levels of government and in the private sector. The program strategy will be implemented to meet the long-term goals listed below. The long-term goals will in turn be achieved by implementing the five-year Action Plans described throughout this document.

b. Long-Term Goals and Guiding Principles

The NPS Management Program is a dynamic and open-ended program intended to facilitate and promote statewide efforts to manage NPS pollution. The long-term goals and guiding principles enumerated below are linked to the vision statement ***"Our mission is to ensure that all water resources are of a quality suitable for use by all citizens and that all surface waters are of a quality suitable to support and maintain aquatic flora and fauna."*** Further, they are the desired end point of the various five-year action strategies described throughout this document. The following long-term goals and guiding principles of the SC NPS Management Program will guide this program for the next 15 years:

1. To continually identify and quantify water quality problems that are caused specifically by NPS pollution including those identified on the state's 303(d) list through NPS water quality monitoring activities conducted by SCDHEC NPS monitoring staff, specific Section 319 assessment projects and activities, SCDHEC ambient surface water monitoring data, the Total Maximum Daily Load development (TMDL) process, and other assessment tools

2. To ensure that all applicable management measures to protect and restore coastal waters will be implemented in the coastal zone within 15 years of February 23, 1998, the date of conditional Coastal Nonpoint Pollution Control Program approval

3. To integrate and implement all applicable management measures on a statewide basis by 2013, exclusive of their requirement for enforceable policies outside of the coastal zone except where statewide regulations already exist or will be promulgated

4. Have controls in place by the year 2013 (in 15 years) that will provide the mechanism(s) to delist 100 percent of 303(d) listed NPS waterbodies and prevent new NPS impacted waterbodies from being listed

5.To focus Section 319 incremental grant funds and non-federal matching resources on Category 1 Priority Watersheds as defined in the Watershed Restoration Action Strategy/Unified Watershed Assessment (WRAS/UWA) process and on 303(d) listed waterbodies within the priority watersheds

6.To focus Section 319 annual grant funds and non-federal matching resources on an NPS management program that balances education, assessment, technical assistance, BMP implementation, and regulation

7. To develop NPS Total Maximum Daily Loads (TMDLs) for all 303(d) listed waterbodies impacted by NPS within 13 years. All NPS TMDLs for waters where dissolved oxygen and fecal coliform bacteria impairments identified on the 1998 303(d) list will be developed by the end of FY-2007. By the end of FY-2010, TMDLs will be completed for waters identified on the 1998 list impacted by nutrients, pH, and toxics from NPS, and all remaining pollutants

8. To maintain and expand partnerships and cooperative opportunities with NPS stakeholders, other agencies, organizations, and citizens

9. To assure effective and efficient use of financial resources and to leverage funds with other programs to target NPS priority issues and areas

10. To have in place animal waste management plans for all agricultural animal facilities in South Carolina that conform with national priorities within 15 years

11. To continue to develop and implement a proactive program protective of the ground-waters of the state by preventing and mitigating impacts from nonpoint sources

12. To continue proactive groundwater management of in-ground wastewater treatment and land application facilities by conducting comprehensive,site-specific evaluations during facility development and long-term compliance monitoring

13. To provide regulatory oversight and technical guidance to responsible parties at facilities where groundwater quality standards have been exceeded to accomplish source remediation, assessment, and groundwater corrective actions

14. To continue proactive coordination with other state programs to implement, maintain, and protect South Carolina's groundwater resources

15. Work proactively with potential applicants in order to insure the Clean Water State Revolving Fund (SRF) is fully accessible for nonpoint source projects

16. To continue to implement NPS programs and initiatives that will prevent NPS impact to water quality

17. To periodically review and assess the goals and objectives of the NPS Management Program and revise the program as appropriate in light of the review

c. Five-Year Action Strategy (Short -Term Goals)

Five-year action strategies that will be implemented to attain the long-term goals are described throughout the document. Each strategy notes the short term goal, the mechanism for implementation, the implementing agency or agencies, and a link to a specific long term goal or goals. This helps to provide an overall, coherent understanding of the Program.

Table 3.1 Strategy Locator

LOCATION OF FIVE- YEAR ACTION STRATEGIES	
Five-Year Action Strategy for Watershed Protection Implementation	Table 3.2
Five-Year Action Strategy for South Carolina's Coastal Zone	Table 3.3
Five-Year Action Strategy for NPS TMDLs	Table 3.5
Five-Year Action Strategy for Support Programs	Table 4.1
Five-Year Action Strategy for Program Integration	Table 6.1
Five-Year Action Strategy for Agriculture	Table 7.3
Five-Year Action Strategy for Forestry	Table 7.4
Five-Year Action Strategy for Urban Activities	Table 7.6
Five-Year Action Strategy for Marinas and Recreational Boating	Table 7.7
Five-Year Action Strategy for Mining	Table 7.8
Five-Year Action Strategy for Hydromodification	Section 7.f.iv
Five-Year Action Strategy for Wetlands	Section 7.g.v
Five-Year Action Strategy for Land Disposal	Table 7.11
Five-Year Action Strategy for Groundwater Protection	Table 7.12
Five-Year Action Strategy for Atmospheric Deposition	Table 7.13

LOCATION OF FIVE- YEAR ACTION STRATEGIES	
Five-Year Action Strategy for Monitoring,	Table 9.1

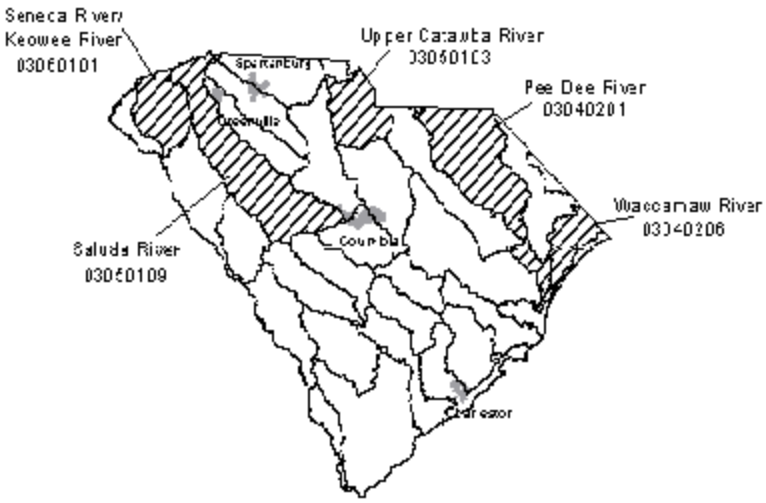
d. South Carolina's Watershed Implementation Plan

i. Description

A central element of the 1998 national *Clean Water Action Plan* is a set of actions that are designed to promote a renewed focus by state, federal, tribal, and local governments on (1) identifying watersheds that have critical water quality concerns and (2) working together to focus resources and **implement Watershed Restoration Action Strategies (WRAS) to solve these problems.** Following the *Clean Water Action Plan* and Environmental Protection Agency directive which called upon states to look at all watersheds within their boundaries and determine whether they (1) meet clean water and other natural resource goals and support healthy aquatic systems or (2) are in need of restoration because the waters within them do not meet, or face imminent threat of not meeting, clean water and other natural resource goals, South Carolina utilized an assessment process known as the Unified Watershed Assessment (UWA). In addition, the state selected priority watersheds for fiscal years 1999 and 2000. Federal guidance dictated that these watersheds be defined as hydrologic unit codes (HUCs) at the 8-digit level. The SCDHEC and the USDA Natural Resources Conservation Service (NRCS) worked together and with other state and federal stakeholders to complete a Unified Watershed Assessment for South Carolina and to select five watersheds as restoration priorities for FY 1999 and 2000.

ii. Coordinated Approach

The state's process for selecting NPS priority watersheds in which to focus resources was developed in coordination and cooperation with federal, state, and local agencies, as well as with watershed-based organizations and the public. With SCDHEC and NRCS as the lead agencies, a number of stakeholder agencies and organizations were involved in the selection process. The process included a meeting with federal agency, state agency, and other organization stakeholders to discuss South Carolina's draft UWA, hosted by the USDA Natural Resources Conservation Service and SCDHEC. As a result of stakeholder comments, the list was modified with one HUC dropped and another added.



To allow an opportunity for public review, an announcement describing the draft South Carolina UWA process and priority watersheds was mailed to over 400 stakeholders throughout the state. This notice was also posted on the SCDHEC web site. The notice provided an opportunity for interested parties to obtain a more detailed packet of information on the draft UWA process and results and FY 1999-2000 priority watersheds, and included agency contacts from whom more information could be obtained.

iii. Monitoring/Assessment

SCDHEC operates a permanent statewide network of over 1000 ambient water quality and biological monitoring sites. Progress toward achieving water quality and natural resource goals is assessed through analysis of data collected via this extensive network.

Five projects targeted for incremental FY 1999 Section 319 funding will provide important additional information on sources of water quality problems in priority watersheds. One project will result in a NPS total maximum daily load (TMDL) for phosphorus. Another will employ new laboratory techniques to differentiate among sources of fecal coliform bacteria (e.g., human, domesticated animals, wild animals). The other monitoring projects aim to identify sources of fecal coliform bacteria, nutrients, and heavy metals, and evaluate NPS impacts on macroinvertebrate communities. All of these evaluations include concise goals and specific milestones, and will contribute directly toward watershed restoration action strategy implementation within their respective watersheds.

iv. Watershed Restoration Action Strategy (WRAS) Implementation

South Carolina follows the UWA procedures in the overall strategy for NPS watershed implementation plans. According to the procedures for UWA, Category I watersheds show non-attainment of clean water or other natural resource goals in more than 20 percent of the assessed waters of the watershed. South Carolina's five 1999-2000 priority watersheds were among those classified as Category I. A list that describes waterbodies and concomitant watershed (defined at the 11-digit HUC level) in the five priority watersheds that have NPS impairments was developed as part of the WRAS. Specific waterbodies and details of impairment were extracted from the state's 303 (d) list. This list of waterbodies in the five priority watersheds is included as part of the annual Section 319 funding guidance, and projects for assessment and implementation within the watersheds that address the parameters of concern are encouraged.

In September 1998, SCDHEC developed and distributed guidance for use of the incremental FY 1999 319 funds allocated to states in support of WRAS implementation. See Appendix 1.This guidance and the projects funded through this program constitute critical first steps in the implementation of WRAS in the five priority watersheds. Nearly 500 guidance packets were distributed. Stakeholders who participated in UWA development also received a copy of the guidance, and several submitted proposals for funding. A total of 49 proposals were received; twelve were selected for funding by a 10-member, multi-agency review committee.

This strategy and process makes up the state's watershed implementation plan. Cooperating partners select and provide for implementation of BMPs and other abatement programs in localized areas within the high priority watersheds. SCDHEC also directs specific resources to these watersheds. The strategy

calls for implementing the plan within the five priority watersheds for at least two fiscal years. In FY 2001, the UWA process will be conducted again and the State NPS Task Force will decide whether to continue to concentrate within those watersheds, or to select new ones.

Continuous agency and public involvement in WRAS implementation is promoted and facilitated by SCDHEC's four watershed managers. These individuals, each responsible for two major river basins, are trained in water quality data evaluation and geographic information systems (GIS), and serve as liaisons with stakeholders. They produce South Carolina's 303(d) list of NPS impaired waters, develop NPS TMDLs, and coordinate WRAS implementation.

Listed below are general strategies for assessment and implementation activities in priority watersheds. This list is not exhaustive; other types of projects will be considered.

Planning and Assessment:

- Develop Total Maximum Daily Loads (TMDLs) for waterbodies within priority watersheds.
- Work with local officials, planners, and other key stakeholders to develop comprehensive watershed management plans and implementation strategies (e.g., workshops, education campaigns, restoration projects, zoning changes, or local stream corridor protection ordinances).
- Design and implement monitoring projects to identify specific pollutant sources, fate, and transport.
- Develop specific recommendations for reducing inputs from identified sources.
- Develop GIS layers for a watershed, including specific land uses and locations of pollutant sources.

Developing Areas:

- Develop and implement informational and technical assistance strategies to educate local officials on how land use policies impact watershed health and water quality.
- Hold workshops for local elected officials, planners, and other interested parties on planned development and "green growth" strategies to deal with urban sprawl. Topics to include: the advantages and application of environmentally friendly zoning, stormwater treatment through created wetlands and other bioretention mechanisms, retention and restoration of wetlands and riparian forests, how local regulations are used in other parts of the country, and tools that are available to assist local entities in reducing the adverse impacts of rapid growth on existing natural resources.
- Design and implement programs (workshops/ field days) for developers and contractors promoting reduction of impervious surface areas, bioretention, alternative materials, retention and restoration of forested riparian buffers, and other conservation-oriented design and development practices. The programs may be sponsored or presented by developers or contractors familiar with these practices including BMPs.
- Develop and distribute educational brochures on innovative site planning and BMPs for new development.
- Construct public parks similar to Hopeland Gardens (Aiken County) for stormwater treatment and flood control.
- Construct wetlands for urban runoff treatment.

Developed Areas:

- Retrofit large impervious areas, such as parking lots, with bioretention systems for stormwater treatment.

- Implement education/outreach programs emphasizing awareness of runoff pollution from urban/suburban areas and the overall effect on the watershed, perhaps a "know your watershed address" program or Water Watch activity. Write television, radio, local media releases on runoff pollution and how individuals can reduce it. Work simultaneously in schools to promote NPS awareness.

Agricultural Areas:
- Manage stream access of livestock by establishing stream crossings, developing alternative water sources, restricting unlimited access through the development and application of a grazing management plan.
- Install riparian forest buffers as a best management practice adjacent to fields and pastures.
- Construct wetlands for treatment of runoff from animal operations.

All Land Uses:
- Implement TMDLs.
- Restore forested riparian (streamside/lakeside) buffers.
- Undertake stream restoration projects that include restoration of in-stream habitat, streambank stabilization, and riparian forest restoration.
- Develop education/outreach programs intended to encourage private land owners to establish forested riparian buffers.

v. Current Projects

Many of the above activities are already underway in priority watersheds. In addition, 11 such projects were selected for FY 1999 319 Incremental funding. Specific, expeditious milestones for these activities are described:

1. *NPS Assessment and Total Maximum Daily Load Development for Phosphorus and Fecal Coliform Bacteria (FC) in the Catawba* (HUA 03050103)
Lead organization: University of South Carolina
Quantify relationships between land use and fecal coliform bacteria and phosphorus.
Evaluate implications of land use on water quality using WARMF model.
Involve stakeholders in development of TMDL for the watershed.

Milestone	Complete
Develop a NPS TMDL for Upper Catawba River	2004

2. *Rawls Creek NPS Assessment and Community Education*
Lead organization: South Carolina Department of Natural Resources
Identify sources of FC in the watershed (HUA 03050109-210)
Mitigate sources with targeted community education about BMPs.
Monitor water quality at 10 sites for 6 storm events and conduct landowner inventory.
Educate landowners in the watershed about reducing NPS pollution.

Milestone	Complete
Conduct 5 NPS presentations to community groups	2000

3. *Fecal Coliform Bacteria and Metals Reduction to Improve and Protect Impaired Waters of Lake Keowee Watershed (HUA 03060101-30,50)*
Lead organization: Friends of Lake Keowee Society

Implement BMPs related to septic tank systems, shoreline erosion, marinas and boating, and logging practices.
Implement a comprehensive educational program about use of these BMPs.
Work with community associations to establish covenant requirements for buffers and septic system maintenance.

Milestone	Complete
Improve and protect 9600 acres (53 percent of Lake Keowee)from septic system failure	2003
Protect 7200 acres (192 shoreline miles) around Lake Keowee with protective buffers	2003
Implement BMPs on 10 pastures in the watershed	2003

4. *Identification and Mitigation of NPSs of Fecal Coliform Bacteria and Low Dissolved Oxygen (DO) in Kingston Lake & Crabtree Creek (HUA 03040206-120)*
Lead organization: Coastal Carolina University
Identify and quantify sources of fecal coliform bacteria and low dissolved oxygen in the watershed.
Demonstrate BMPs in a residential development.
Work with local governments to implement controls for NPS pollution.
Create a web page about the project and other info/educational material.
Gather data for TMDL development.

Milestone	Complete
Conduct stormwater and baseline sampling to include at least 5 storm events	2000
Calculate NPS loads in Crabtree Canal	2001
Retrofit existing BMP (retention pond) to make it more effective in reducing NPS pollution. Measure performance.	2002
Hold 3 informational/outreach meetings to educate citizens	2002

5. *Extent of Metal Contamination along Mill Creek, Langston Creek, and Reedy River* (HUA 03050109-040,100)
Lead organization: Furman University
Gather data about metals contamination in these waterbodies.
Components include determination of sources of contaminants, determination of effects on aquatic populations, dissemination of results.

Milestone	Complete
Develop mitigation plans to reduce metal contamination on 5 streams in the watershed	2000

6. *Lancaster Greenway Preserve Buffer Strip Restoration* (HUA 03050103-042)
Lead organization: Katawba Valley Land Trust (KVLT)
Restore riparian forest buffers along the Catawba River tributaries on land owned by the KVLT.
Contributes to implementation of the Catawba River Corridor Plan.
Includes educational component.

Milestone	Complete
Restore 200' wide forested buffer along 800' of Bear Creek	2002

7. *Reduction of NPS in Three Impaired Watersheds by Implementation of Home*A*Syst* (HUAs 03040201-150, 03050109-100, 03060101-080)
Lead organization: Clemson University
Develop and implement a Home*A*Syst program tailored to specific water quality problems identified in each of three watersheds (Seneca/Keowee, Saluda, Pee Dee).

Milestone	Complete
Reduce NPS impacts in 14,000 acres of Smith Sw. Watershed.	2002
Reduce NPS impacts in 30,000 acres of Reedy R. Watershed.	2002
Reduce NPS impacts in 140 acres of Ninety Six Cr. Watershed.	2002
Reduce NPS impacts in 30 miles of stream shoreline around L. Keowee	2002

8. *Using GIS Technology to Improve Stream Quality in the Seneca River/Lake Keowee Watershed: Identifying Macroinvertebrate and Fecal Coliform Impairment* (HUA 03060101-100, 070, 040, 050, 080)
Lead organization: Clemson University
Identify land use practices impacting macroinvertebrate communities in two watersheds.
Develop information materials to help residents to understand the need for water quality protection. Develop a GIS model for predicting how land use practices impact macro- invertebrate communities.

Milestone	Complete
Identify NPS sources of FC bacteria in watersheds of 5 creeks	2002
Identify NPS sources adversely impacting macroinvertebrate community watersheds of 2 creeks	2002

9. *Constructed Wetland for Failing Septic Tank Systems (HUA 03050109-190, 200)*
Lead organization: East Piedmont RC&D
Install constructed wetlands as an alternative to standard septic systems on up to 10 sites where conventional systems are failing.

Milestone	Complete
Reduce FC bacteria contamination in Little Cr., Caney Cr., and Camping Cr. by installing 10 alternative septic systems (constructed wetlands)	2002

10. *Identification and Restoration of Compromised Riparian Areas - Reedy River Watershed* (HUA 03050109-100, 110, 120)
Lead organization: Friends of the Reedy River
Identify and categorize riparian areas in the Reedy River and all tributaries.
Develop database of landowners of all riparian areas.
Reconnaissance of 325 miles of streams and inventory of riparian conditions.
Provide this information to local S&WCD so they can work with landowners to correct problems.
Selected areas will be explored for acquisition.

Milestone	Complete
Identify and initiate corrective action plan to restore 325 miles of riparian buffer along critical streams in the watershed.	2002

11. *Water Quality Improvements in the Socastee Cr. Drainage Through Community Education and BMP Implementation* (HUA03040206-120)
Lead organization: SCDHEC Office of Ocean and Coastal Resource Management
Identify, through evaluation of existing data, specific NPS problem areas. Hold watershed workshops on watershed management issues. Create a regional management plan for water quality improvement.

Milestone	Complete
Identify and initiate a regional NPS management plan for Socastee Creek through a series of 3 workshops and meetings with local communities.	2002

vi. Schedule

Twenty-five Category I watersheds in South Carolina were selected under the UWA identification process. They were ranked and placed into five priority categories (one through five) and will be addressed on an appropriate time line.

As the criteria used to determine priority order (e.g. water quality, land use, land management practices, etc.) are not static, but are continually changing, South Carolina will revisit these priority rankings and schedule, and revise them as needed.

Restoration measures will be implemented and maintained by stakeholder organizations, and monitored and evaluated by the funding agencies.

vii. Five-Year Action Strategy for Watershed Protection Implementation

The following table describes the short term goals to implement the strategy.

Table 3. 2 Five-year action strategy

Short Term Goal	Mechanism	Implementing Agency	Long Term Goal Reference
1. Implement programs so as to reduce NPS pollution in 5 priority watersheds by 20 percent through implementation of the WRAS process and enforceable policies by the end of 2002. See also Action strategies in categorical chapter	WRAS implementation strategy, Section 319 grant projects, voluntary efforts by cooperating organizations and watershed residents	SCDHEC and cooperating agencies	# 4
2. Implement programs so as to restore and protect watersheds identified in the SC WRAS so that 75 percent of waters in the state support designated uses by 2005	Combination of NPS implementation strategies (e.g., WRAS) and enforcement of existing regulatory mechanisms. See five-year action strategies in other chapters for specific mechanisms	SCDHEC and other state and federal agencies, cooperating organizations, and the public	# 4
3. Implement programs so as to reduce sediment loads in waterbodies of priority watersheds by 20 percent by the year 2005	Combination of NPS implementation strategies (e.g., WRAS) and enforcement of existing regulatory mechanisms. See five-year action strategies in other chapters for specific mechanisms	SCDHEC and other state and federal agencies, cooperating organizations, and the public	# 4
4. Implement programs so as to prevent NPS impacts to water quality where water quality is currently meeting state standards	In-place permitting programs, education and outreach programs, specific components of Section 319 projects, and initiation of no discharge zone in certain lakes and coastal waters	SCDHEC and other state and federal agencies, cooperating organizations, and the public	#16

e. South Carolina's Coastal Nonpoint Program Implementation Strategy

i. Fifteen-Year Program Strategy

Goal: To ensure that all applicable management measures to protect and restore coastal waters will be implemented within 15 years of February 23, 1998, the date of conditional Coastal Nonpoint Pollution Control Program approval.

Note: The SC Coastal Nonpoint Pollution Control Program is being revised pending comments from NOAA and EPA and will be finalized prior to receiving full approval which is anticipated by January, 2000.

The purpose of this strategy is to generally describe the approach that will be used to ensure widespread and effective management of polluted runoff in the coastal zone. The SCDHEC Office of Ocean and Coastal Resource Management and Office of Environmental Quality Control, Bureau of Water will be primarily responsible for implementing these goals. Other SCDHEC program areas and other cooperating agencies will also have roles and responsibilities. Three types of programs are used to meet this general goal. These are 1) regulatory programs, 2) voluntary programs, and 3) watershed planning programs. The specifics of which programs are used to implement specific management measures are discussed in Section e. ii of this chapter. The amount of effort necessary to achieve acceptable levels of management measure implementation and water quality protection varies by NPS source and measure. The multiple types of runoff associated with urban sources are the priority concern in the coastal zone. However, all significant sources in all areas of the coastal zone will be addressed.

The primary goal will be achieved through implementation of the four objectives discussed in the following pages. The coastal zone is comprised of eight counties. Four of these counties are our geographic priority for the years 1999 through 2003. The activities that will be undertaken in these counties in this first 5-year period are detailed in the 5-year implementation plan. The other four will be addressed during the period 2003 through 2008. The last five years of the 15-year strategy will be used to address hot spots, gaps and other problem areas.

Objective 1: Ensure all applicable agricultural, forestry, urban, marinas and recreational boating, wetlands, and hydromodification management measures that are significant sources of polluted runoff are implemented in the coastal zone.

While the implementation rates of some management measures are known, and statewide goals for compliance have been set for some, current implementation rates for the coastal zone have not yet been established for all measures. Once this has been done, compliance goals will be set and activities undertaken to ensure those goals are reached.

Task		**Schedule**
1.	Determine current management measure implementation rates.	2000
2.	Set 5-year incremental management measure implementation goals for each category or subcategory of runoff, as appropriate.	2001
2a.	Meet incremental goals for:	
	Beaufort, Berkeley, Charleston, and Dorchester counties	2003, 2008, 2013
	Colleton, Georgetown, Horry, and Jasper counties	2008, 2013
3.	Coordinate with the Bureau of Water on reduction of NPS pollution to achieve TMDL recommendations.	2000-2013
4.	For categories or subcategories of NPS with low management measure compliance, evaluate the need for mandatory implementation of those measures currently implemented through non-regulatory programs.	2003, 2008

Objective 2: Maintain a flexible and current long-term program strategy that reasonably assesses both progress in management measure implementation and in coastal water quality protection and restoration.

In order to assure the programs being implemented are effective at protecting water quality, baseline assessments will be completed. Additionally, selected indicators of watershed health will be identified and measured to assess success. These assessments will be regularly evaluated and used to revise the 15-year strategy to insure the primary goal is being met.

	Task	**Schedule**
1.	Develop a baseline assessment of coastal water quality from currently available data.	2000
2.	Establish a management measure implementation tracking program.	2000
3.	Identify 5 key indicators of coastal water quality.	2001
4.	Develop a new 5-year implementation plan	2003, 2008
5.	Re-evaluate and revise as necessary the 15 year program strategy.	2003, 2008
6.	Evaluate the efficacy of the 5 key indicators and make revisions as necessary.	2003, 2008, 2013
7.	Produce and distribute, through the OCRM web page and print media, a report that documents progress, status and trends entitled *Managing Polluted Runoff on the Coast: Status Report*	2003, 2008, 2013

Objective 3: Implement any additional management measures necessary to protect coastal waters.

For some coastal waters, voluntary management measure implementation or implementation of standard management measures and BMPs may not be adequate to protect and restore water quality. After identifying those waters with continuing problems, assessments of the level of management measure compliance in the surrounding watersheds will be conducted. If compliance is low, steps will be taken to increase compliance including as a last resort mandating compliance. If management measure compliance is high but water quality is still not adequately protected, additional management measures which address the source of the water quality problem will be identified and implemented.

	Task	**Schedule**
1.	Identify coastal waterbodies that do not meet standards or that are experiencing declining trends in water quality.	2003, 2008
2.	Assess the level of management measure implementation in the watershed of the identified waterbodies.	2003, 2008
3.	Develop watershed strategies to increase the level of management measure implementation if appropriate.	2003, 2008

Task		Schedule
4.	For sources or watersheds with low management measure compliance, evaluate the need for mandatory implementation of those measures implemented through non-regulatory programs.	2004, 2009
5.	For watersheds or sources with high management measure compliance and continuing water quality problems, identify additional management measures to control the sources of pollution causing the water quality problems.	2004, 2009
6.	Assess the compliance rates for voluntary implementation of the additional management measures.	2006, 2010
7.	Through the designated watershed process and the Pollution Control Act, require mandatory implementation of the additional management measures as necessary to protect and restore coastal waters.	2008, 2012

Objective 4: Ensure that the management measures and BMPs advocated and required by the state are effective at meeting water quality protection goals.

Research and advances in technology are constantly impacting the state-of-knowledge regarding control of NPS pollution. To insure the management measures and BMPs advocated by the state reflect these advances, updates will be made to the manuals, regulations, and programs used to insure effective management of NPS.

Task		Schedule
1.	Update as necessary the State *Stormwater Management and Sediment Control Handbook.*	2002
2.	Update as necessary the standard conditions on wetland modification certifications	2004
3.	Update as necessary *South Carolina's Best Management Practices for Forestry*	2005
4.	Update as necessary the agricultural BMP manual, *Farming for Clean Water in South Carolina, a Handbook of Conservation Practices*	2007
5.	Update as necessary the regulations governing Marina operation.	2009

ii. South Carolina's Coastal Zone Five-Year Implementation Plan February 1999 - February 2003

The following implementation plan will be focused in the coastal counties of Beaufort, Berkeley, Charleston, and Dorchester, unless otherwise noted. The 5-year period, 1998-2003, is required under the Section 6217 Final Administrative Changes, and is therefore somewhat out of sync with the various

statewide 5-year action plans presented throughout this document. However, those statewide plans, e.g., forestry and agriculture, are still applicable to the coastal zone.

Table 3.3 Five-Year Implementation Plan for South Carolina's Coastal Zone

ACTION ITEM	*LONG TERM GOAL REF.*	*IMPLEMENTING AGENCY(S)*	*MILESTONE(S)*	*MECHANISM*
URBAN - wetlands, watershed protection, and hydromodification				
1. Complete pilot wetland restoration project in Dorchester Co.	2	SCDHEC	Final report and printing of 5000 pamphlets - 1998 Symposium presentation and mailing to interested parties - 1999	Funded with §319 and state funds
2. Complete GIS approach to managing wetlands project in Beaufort and Jasper Counties	2	SCDHEC	Complete final report on Broad & New River Watersheds Wetland Management Project including an interactive GIS designed for planners, permit writers and property owners - 1999	EPA grant and state funds
3. Develop a coastal urban wetland restoration initiative	2	SCDHEC	Develop brochure on initiative framework and distribute- 1999 Conduct restoration project in Charleston Co. - 2000-2001 Final report and initiative promotion - 2001-2002	Funded with §319 and state funds
4. Impaired priority watershed evaluation and restoration strategy development in Horry Co.	2	SCDHEC	Evaluate watershed monitoring; develop educational series; conduct planning/management charette and produce report - 1999-2000 Develop strategy to implement BMPs to reduce fecals, zinc, low DO - 2000	Funded with §319 and state funds
URBAN - new and existing development, construction site chemical control				
5. Conduct urban stormwater retrofit demonstration project in Charleston Co.	2	SCDHEC	Install STORMTREAT System and conduct 2 workshops to demonstrate innovative retrofit - 1999-2000	Funded with §319 and state funds
6. Develop stormwater pond maintenance guide	2	SCDHEC	Print 5000 Guides - 2000 Distribute & promote - 2000-2002	Funded with NOAA §6217, §310, and state funds
7. Develop urban BMP manual on newer stormwater technologies and BMPs	2	SCDHEC	Develop urban BMP manual and print 1000 copies - 2000	Funded with NOAA §6217, §310, and state funds
8. Conduct 3 urban BMP manual/stormwater maintenance guide workshops	2	SCDHEC	Conduct at least 3 workshops to cover the entire coastal zone – 2001	Funded with NOAA §6217, §310, and state funds

9. Develop construction site chemical control (CSCC) manual, including roads, highways and bridges	2	SCDHEC	Develop CSCC manual - 1999 Promotion & distribution campaign – 2000	Funded with NOAA §6217, §310, and state funds
URBAN - general/mixed				
10. Develop a Nonpoint Education for Municipal Officials (NEMO) program addressing 4 impaired watersheds in Georgetown and Horry Counties.	2	SC Sea Grant Consortium	Present program to 5 municipalities and provide follow-up technical assistance – 1999-2000 Evaluate indicators of program impact on NPS management; produce final report – 2000	Funded with §319 and state funds
11. Develop and evaluate SC Coast-A-Syst program, targeting 2 impaired watersheds in Horry Co.	2	SC Sea Grant Consortium	Mail 1000 surveys to evaluate current homeowner practices – 1998 Develop program, print program materials and conduct 3 training sessions for promoters within watersheds – 1999 Assess effectiveness via follow-up surveys; create Coast-A-Syst web site; produce final report - 2000	Funded with §319 and state funds
12. Identify and mitigate NPS fecal and low DO in high priority watershed in Horry Co.	2	Coastal Carolina University	Conduct stormwater and baseline sampling; calculate NPS loads – 2000-2001 Retrofit retention pond with innovative BMP and measure performance - 2002 Conduct 3 public informational meetings; final report to aid TMDL development – 2002	Funded with §319 and state funds
13. Develop Beaufort Co. Special Area Management Plan (SAMP) to protect and restore waterways of Beaufort Co.	2	SCDHEC	Develop: pilot watershed-level stormwater management plan; river overlay district standards. Identify treatment standards for bridge and road runoff - 1999 Develop: stormwater utility; management plan for Broad Creek; onsite disposal system (OSDS) program; mechanism to coordinate water quality monitoring; boating management plan; citizen outreach and education efforts. Map existing and potential direct discharge and land application sites - 2000-2001 Begin SAMP implementation - 2000-2002	NOAA grant

14. Educate citizens and local governments on Charleston Harbor Project SAMP research efforts. Consolidate research recommendations into plan to preserve and restore water quality in the Charleston Harbor watershed	2	SCDHEC	Produce and distribute 1500 copies of *The Citizen's Guide to the Charleston Harbor Project* - 1998-1999 Develop comprehensive Charleston Harbor Management Plan - 1999 Implement plan - 2000-2003	NOAA grant and state funds
URBAN - OSDS				
15. Revise OCRM review and certification procedures for large-scale OSDS; include nitrogen loading to N-sensitive surface waters	2	SCDHEC	Submit final report - 2000 Conduct training of OCRM reviewers for coastal zone application - 2000	Funded with NOAA §309 and state funds
16. Assist local governments in establishing OSDS maintenance programs	2	SCDHEC	Complete Folly Beach (Charleston Co.) pilot project and submit final report - 2000 Assist a community in Beaufort, Berkeley, and Dorchester Counties - 2000-2003	Funded with NOAA §309 and state funds; Funding to be explored (possibly SRF)
17. Develop a voluntary pilot OSDS inspector training and certification program	2	SCDHEC , Clemson U. Ext. Ser.	Conduct program feasibility study - 2000 Implement pilot program and assess feasibility of permanent program - 2001-2002	Funded with §319 and state funds
18 Participate in revision/updating of state OSDS regulations	2	SCDHEC	Participate on OSDS Technical Committee; conduct literature search and prepare final report - 1998-1999 Participate on Impacts Committee and stakeholder reviews of proposed regulations - 1999-2000	State funds
19. Present revised OSDS regulations to state legislature	2	SCDHEC	passage of new statewide OSDS regulations - 2001	State funds
INSPECTIONS AND ENFORCEMENT IN COASTAL ZONE				

20. Inspect permitting and certification activities; conduct enforcement actions where necessary	2	SCDHEC	Marinas - inspect critical area marinas 4 times per year; inspect all other marinas 2 times per year - 1998-2003 Land disturbance activities and freshwater wetland certifications - inspect 900+ stormwater projects during and after construction, including wetland protection provisions - 1998-2003 Critical area permits with erosion control provisions - inspect 300 projects per year for erosion and sediment control - 1998-2003	NOAA §306 and state funds
CNPCP IMPLEMENTATION TRACKING & PROGRAM EFFECTIVENESS				
21.Measure the success of the CNPCP by developing a mechanism for tracking implementation of all aspects of program (including areas managed by other agencies or groups)	2	SCDHEC	Acquire data management and tracking software and develop a tracking mechanism/program - 1999-200 Complete summary report of coast-wide CNPCP progress as tracked by new system - 2001	Funded with NOAA §6217, §310, and state funds
22. Measure program impacts on water quality	2	SCDHEC	Develop a baseline assessment of coastal water quality from current available data - 2000 Identify 5 key indicators of coastal water quality - 2001	State funds
PUBLIC OUTREACH AND EDUCATION				
23. Increase public awareness of CNPCP	2	SCDHEC	Acquire computer and software to support web site development and maintenance - 1999-2000	Funded with NOAA §6217, §310, and state funds
24. Coordinate with statewide NPS Education Program to target coastal zone, especially urban areas in proximity to impaired and pristine waters	2	SCDHEC	Contribute at least 2 articles per year in the quarterly newsletter *Turning the Tide* - 2000-2003 Explore other avenues for coordination - 1999-2003	State funds

25. Actively promote use of State Revolving Fund (SRF) loans to units of government for NPS and estuary type projects	2	SCDHEC	Incorporate SRF program information into OCRM web site - 1999-2003 Include SRF loan information on urban wetland restoration initiative brochure and other NPS related brochures, manuals, and programs - 2000-2003	State funds
26. Establish an information distribution mechanism to effectively serve the natural resource and planning needs of local governments in the coastal zone	2	SCDHEC	Conduct a needs/capacity assessment; develop an information index containing management and planning links and reports within the coastal area; develop an Information Distribution Action Plan; institute a Planning Information Clearinghouse - 1999-2001	NOAA fellowship, state funds

f. SC Watershed Water Quality Management Strategy

i. Description

In 1991 SCDHEC instituted the Watershed Water Quality Management Strategy (WWQMS) in order to more efficiently protect and improve the quality of South Carolina's surface water resources. This management strategy recognizes the interdependence of water quality and all the activities that occur in the associated drainage basin. Under the watershed management approach, monitoring, assessment, problem identification and prioritization, water quality modeling, planning, permitting and other SCDHEC initiatives are coordinated by basin. A watershed management strategy document is produced for each basin.

River Basins defined by the WWQMS

For purposes of this program, South Carolina is divided into 8 major drainage basins (see map above): the Savannah, Salkehatchie, Saluda, Edisto, Broad, Catawba, Santee, and Pee Dee. Previous documents described five basins where Savannah and Salkehatchie, Saluda and Edisto, and Catawba and Santee were grouped together. The five basin strategies are available for viewing on the DHEC Home Page. Water quality monitoring, assessment, and implementation activities such as NPDES permitting, education, and planning are performed for each basin during a five-year cycle. The current cycle for each basin is presented below:

Table 3.4 WWQMS Basin Rotation Schedule

	FFY98	FFY99	FFY00	FFY01	FFY02
Broad	Implementation	Monitor, Public Workshops	WQ Assessment Strategy Dev.	Strategy Dev. Wasteload All.	Permit
Savannah Salkehatchie	Permit	Implementation	Monitor, Public Workshops	WQ Assessment Strategy Dev.	Strategy Dev. Wasteload All.
Saluda Edisto	WQ Assessment Strategy Dev. Wasteload All.	Permit	Implementation	Monitor, Public Workshops	WQ Assessment Strategy Dev.
Catawba Santee	Monitor, Public Workshops	WQ Assessment Strategy Dev. Wasteload All.	Permit	Implementation	Monitor, Public Workshops

	FFY98	FFY99	FFY00	FFY01	FFY02
Broad	Implementation	Monitor, Public Workshops	WQ Assessment Strategy Dev.	Strategy Dev. Wasteload All.	Permit
Pee Dee	Monitor, Public Workshops	WQ Assessment Strategy Dev.	Strategy Dev. Wasteload All.	Permit	Implementation

ii. Water Quality Monitoring

In addition to routine monitoring activities in all basins, each year SCDHEC scientists collect additional water chemistry and biological information for one of the five basins. Analyses of these data reveal problem areas and long-term water quality trends. Public workshops are held in each basin to identify public concerns for water quality and to inform the public about our watershed efforts.

iii. Strategy Development and Preparation of WWQMS Document

After completion of monitoring, SCDHEC analyzes the data and identifies problem areas. Total Maximum Daily Loads (TMDLs) for problem areas are then developed. Future WWQMS documents will incorporate TMDL summary information as well as other information about the basin including: 1) water chemistry information, 2) biological monitoring information, 3) physical characteristics, 4) natural resources, 5) growth potential, 6) potential NPS contributions, and 7) groundwater concerns/point source dischargers.

iv. Implementation

SCDHEC's watershed managers focus on identifying sources of water quality problems in each basin and developing plans to control the sources. Strategies such as special studies and corrective action plans are implemented to address the water quality concerns of the basin throughout the five-year cycle. The watershed managers work closely with interested parties and local governments as well as state and federal agencies to carry out the desired strategies.

v. Permitting

National Pollutant Discharge Elimination System (NPDES) permits for all point source discharges are reviewed and issued by SCDHEC for a particular basin grouping according to the five-year cycle. This allows SCDHEC to assess the impact of all discharges in a basin during one year and enables the agency to efficiently determine appropriate permit limits.

vi. Coordination

The success of the watershed program depends on SCDHEC's ability to work with local and regional governments, lake and river associations, industry representatives and other concerned groups in order to exchange information and develop management strategies to protect and promote the wise use of South Carolina's surface and groundwater resources.

vii. WWQMS Strategy Activity Milestones

Specific, expeditious milestones for the WWQMS program related to NPS are described below. The following activities are conducted by SCDHEC Watershed Managers in specific watersheds; activities that support the statewide NPS Management program will be implemented.

Milestone	Complete
Produce and conduct 3 public workshops to explain WWQMS	1999
Coordinate in the development of 10 NPS TMDLs	1999

g. TMDL Strategy

i. Description

A total maximum daily load (TMDL) is a tool for implementing state water quality standards and is based on the relationship between pollution sources and in-stream water quality conditions. The TMDL establishes the allowable loadings or other quantifiable parameters for a waterbody and thus establishes the basis for states to establish water quality-based controls for both point and NPS problems. These controls should provide the pollution reduction necessary for a waterbody to meet water quality standards.

Section 303(d) of the Clean Water Act and 40 CFR Part 130 establish the TMDL process to provide for more stringent water quality-based controls when technology-based controls for point sources are inadequate to achieve state water quality standards. The TMDL process affords a broad opportunity for states to work with all affected parties in the watershed, including federal agencies, to develop technically sound and legally defensible decisions for attaining and maintaining water quality standards. Further, once developed, the TMDL provides a road map for implementing both the point source and NPS controls that will achieve water quality standards.

The TMDL process applies to waterbodies affected by point sources only, a combination of point and nonpoint sources, and nonpoint sources only. Appropriate technical tools will be used to develop all TMDLs. There are uncertainties in estimating nonpoint source loads and in determining the load reductions that will assure compliance with water quality standards; therefore, a phased or iterative approach will be used for many TMDLs. This approach is based on available data and information, professional judgement, and a margin of safety, as recommended by EPA. Monitoring will confirm that TMDL implementation results in attainment of water quality standards. If not, the TMDL will be re-evaluated based on the new monitoring data.

South Carolina has developed a plan to insure that TMDL allocations for nonpoint sources in impaired waters of the state will be implemented. This plan integrates existing regulatory and non-regulatory tools currently available to state and local governments with current and proposed planning and funding mechanisms. The strategy for development and implementation of NPS TMDLs is incorporated into the NPS Management Program.

Given that some uncertainty exists in how effective various measures will be in eliminating NPS loads, the SCDHEC anticipates some refinements over time to TMDL recommendations. These will normally correspond with the two year iterations of the 303(d) listing process. Additionally, the state will continue to identify and implement remedial actions for all 303(d) listed waters, regardless of whether a TMDL has been developed. The federal Clean Water Action Plan provides a methodology and resources for such activities.

The state intends to achieve wasteload and load allocation reductions in 303(d) listed waters in order to achieve the water quality goals of the Clean Water Act. This includes waters impaired solely or primarily by NPS sources. For each such water, a TMDL will be established that includes specific recommendations for reducing NPS loads. In making these recommendations various pollution control best management practices (BMPs) will be cited for specific applications. The BMPs recommended will be selected from the total inventory available as described in EPA's *Guidance Specifying Best Management Practices for NPS Control in Coastal Waters* as well as those that have been applied successfully in South Carolina and nationwide. BMPs selected will have been proven effective and in most cases will have data available for pollutant removal efficiencies. Innovative and novel solutions will be considered.

The state has an effective NPS management process that will be enhanced to implement NPS related TMDL recommendations. Through the state's Section 319 program, considerable expertise in advocating and implementing NPS control BMPs has been gained by SCDHEC and its partner agencies, governments, and individuals. Beginning in FY 1999 the state will integrate further the Section 319 Program with TMDL resolution by applying Section 319 funding preferentially to 303(d) listed waters. As TMDLs are developed, the Department will refine and focus Section 319 program resources to effect implementation of specific recommendations contained in TMDLs. However, the Department will not necessarily require an existing TMDL for Section 319 funded projects. The Department recognizes that in some cases it is more efficient to take pro-active remedial action rather than waiting for TMDL development.

The state has regulatory programs that can and will be used to cause implementation of NPS load reductions where recommended. As described below and in later chapters, the state has existing regulatory authority to compel BMP installation and maintenance in certain cases. The Department will continue to enforce its NPS related regulatory authorities and will focus such efforts in TMDL watersheds as necessary.

SCDHEC will integrate other programs, such as the Watershed Water Quality Management Program and NPS Education and Outreach with remedial efforts and TMDL implementation. The Department recognizes that for most 303(d) waters in which impairment results primarily from NPS loads, it will need to seek and obtain the support and voluntary involvement of key stakeholders in the watershed. The Department has ongoing programs aimed at educating and enlisting the support of the citizenry towards the goal of reducing each person's NPS contribution. Using the watershed approach, such programs have built and will continue to build partnerships between the Department and private and public stakeholders.

ii. Public Participation

Public participation is required for all TMDLs under Clean Water Act regulation 40 CFR Part 25. This public participation will be especially vital for NPS TMDLs. The Department has programs in place that have been used for gaining public and interagency input on a variety of water quality related issues. The Department will continue these programs and refine them to support NPS TMDL development and

implementation with due consideration of applicable regulations and the recommendations contained in the July 7, 1998 TMDL Federal Advisory Committee Act (FACA) report.

The interested public may comment on proposed NPS TMDLs as they are developed. A public notice is mailed to interested parties on a large, comprehensive recipient list. Persons wishing to comment or offer new data for the TMDL may make written submissions to SCDHEC. They may also view the TMDL, related technical information, data, and supporting analyses at the SCDHEC offices. A minimum of 30 days is allowed for comment.

iii. Relevant Watershed Management Processes

The Department intends to utilize existing programs to enhance the implementation of NPS load reduction measures in watersheds requiring TMDLs. The NPS Management Program will be an integral part of TMDL implementation. Using Section 319 funds, the NPS Management Program will be a vital funding mechanism for implementation projects in watersheds requiring NPS load reductions. The Program includes projects conducted by DHEC itself or by other natural resource cooperators aimed at assessing and or mitigating all major classes of NPS pollution in the state including that from forestry, agricultural and urban land uses. The Program now has a watershed focus that prioritizes projects based on type and degree of impairment.

Supported in part through Clean Water Act Sections 104(b)(3), 205(j)/604(b), and 319(h) funding, the Watershed Water Quality Management Strategy (WWQMS) organizes the Department's water quality efforts on a rotating basis among five major river basins. Coordinated activities include permitting, monitoring, water quality assessment, strategy development, and wasteload allocation. Assessment and mitigation of NPS problems has been a significant ongoing activity of the Watershed Managers assigned to the program. The Watershed Managers are now responsible for developing TMDL's identified as being primarily due to NPS sources. They will utilize their knowledge of NPS problems at the local level, and with existing and future partnerships among watershed stakeholders, will develop TMDLs. They will then work to facilitate TMDL implementation.

As called for in the 1996 amendments to the Safe Drinking Water Act, the Department has begun the planning and development of a statewide source water assessment and protection program. Key components of the program will be the development of a watershed-based source water protection delineation, contaminant inventory and a susceptibility analysis. This information will be used in the prioritization, development and implementation of certain NPS related TMDLs.

Section 208 Water Quality Management Planning has the potential of being a significant tool for NPS TMDL implementation by involving regional planning agencies and local governments, both key watershed partners, in TMDL implementation. The Department currently has memoranda of understanding with the five designated Councils of Government (COGs) which outline cooperation on point source related TMDLs. The COGs current role as mediators in wasteload allocation decisions related to point sources could potentially be expanded to include decision making ability for NPS controls in their planning areas, especially those sponsored by local governments. As with point source related TMDLs the Department will, for example, encourage local governments and regional planning agencies to use Section 208 planning as a guideline for implementing some NPS controls.

South Carolina participates in a continuing planning process (CPP) as described in Section 303(e) of the Clean Water Act. Our CPP planning document serves as an index to more specific program documents,

statutes, and regulations. A description of the TMDL implementation process for nonpoint sources will be incorporated into the plan.

iv. South Carolina's Approach to TMDL Implementation

South Carolina will employ a multi-faceted approach to the implementation of TMDLs in which the complete array of tools, programs and methodologies available to the Department and its partners will be utilized.

Prioritization of TMDL implementation is based in part on regulation 40CFR130.7(b)(4) which requires that impaired waters be prioritized by the severity of impairment and the use support required of the waterbody. The Department has incorporated this in the priority and targeting aspects of its 303(d) list. Another key factor in prioritizing the implementation of NPS TMDLs will be an evaluation of the existing or committed cooperation of key stakeholders and other NPS partners in the watershed of interest. Since many NPS controls will be voluntary, close cooperation with watershed partners will be vital for the success of implementation efforts. Watersheds where these relationships are strong will usually receive higher priority for implementation. Prioritization will also take into account other practical opportunities, such as TMDL nesting as recommended in the TMDL FACA Report.

Existing NPS partnerships such as with the USDA, South Carolina Department of Natural Resources, Clemson University Extension, Councils of Government, the state's universities, and Conservation Districts have been vital to South Carolina's NPS management program. The Department will work to encourage these organizations to focus their water quality improvement efforts related to NPS pollution towards projects in 303(d) watersheds by means of the Department's membership on the NRCS State Technical Committee, the State NPS Task Force, and other statewide workgroups. As stated above, local partnerships are also being developed in 303(d) listed watersheds through current and future watershed management activities. Input from these partnerships will involve both source assessment and implementation activities related to TMDLs.

Authorities, mechanisms, and tools are available from the Department for use in implementing potential NPS controls recommended in TMDLs:

Regulatory:
- The SC Pollution Control Act
- SC Stormwater Management and Sediment Control Act
- Navigable waters permitting and enforcement
- Municipal and industrial stormwater NPDES permits
- Section 401 water quality certifications
- Onsite wastewater permitting and enforcement
- Agricultural animal facility permitting and enforcement
- Mining and reclamation permitting and enforcement
- Solid waste landfill permitting and enforcement
- Hazardous waste facility permitting and enforcement

Non-regulatory:
- Watershed Water Quality Management Strategy
- BMP implementation through cooperative activities
- BMP implementation through cooperative activities with local governments

- BMP implementation through cooperative activities with non-governmental watershed stakeholders
- Source Water Protection Program
- South Carolina Water Watch Program NPS Education Program

Resources: The state of South Carolina and its partners will dedicate considerable resources towards the achievement of NPS load reductions called for in TMDLs. The primary funding sources that the state will use to promote TMDL implementation are the Section 319 NPS grant and the Clean Water State Revolving Fund. Additionally, numerous DHEC organizational units will be active in the process.
Among those are:

- Watershed Water Quality Management
- Environmental Quality Control Districts statewide
- Water Quality Monitoring
- Industrial and Agricultural Permitting
- Source Water Assessment and Protection
- Ocean and Coastal Resource Management
- Public Education and Outreach
- Shellfish Sanitation
- Onsite Wastewater Management
- Water Quality Certification
- Water Enforcement

South Carolina's NPS partners are expected to devote resources towards TMDL implementation. *Among these partners are:*
Natural Resources Conservation Service

- SC Forestry Commission
- US Forest Service
- Conservation Districts
- Department of Natural Resources
- State and private universities
- Clemson University Extension
- South Carolina Sea Grant Consortium
- Local Municipalities
- Regional Councils of Governments
- Nonprofit Cooperators
- Community Associations

Based on continuing and past successes in combating NPS pollution at the statewide level and with the cooperation of our statewide NPS partners, the Department feels that this plan can provide a reasonable assurance that TMDL NPS load reductions can be achieved through implementation of these recommendations. It should be clear though that this plan will be an evolving process. The above mentioned tools and programs will be refined and augmented as necessary to meet changing needs and to take advantage of new knowledge and opportunities.

Beginning in FY 2000, a full-time nonpoint source TMDL specialist within SCDHEC Bureau of Water will develop total maximum daily loads for impaired waters in priority watersheds, using the BASINS model and other appropriate tools. TMDLs will be scientifically defensible and in conformance with EPA guidance. NPS TMDLs will be developed for priority watersheds, which will in turn allow more expedient implementation. Better Assessment Science Integrating Point and Nonpoint Sources

(BASINS) is currently the recommended tool for development of TMDLs for waterbodies affected by a combination of point and nonpoint sources, or by nonpoint sources only. BASINS requires input from a variety of data sources.

v. Five year Action Strategy for NPS TMDLs

The table below describes the action strategy for NPS TMDL development and implementation. SCDHEC Watershed Managers will be responsible for oversight of TMDLs within their watershed. An unknown number of TMDLs will also be developed using Section 319 funds earmarked for assessment purposes.

Table 3.5 Five-year Action Strategy for TMDLs

ACTION ITEM	LONG TERM GOAL REFERENCE	***MECHANISM***	***IMPLEMENTING AGENCY***(S)
1. Develop 15 NPS TMDLs by 2003	# 6	TMDL strategy, Section 319 funding	SCDHEC BOW, cooperating agencies through Section 319 funded projects
2. Begin implementation of at least three NPS TMDLs by 2003.	# 6	TMDL strategy, Section 319 funding	SCDHEC BOW, cooperating agencies through Section 319 funded projects

CHAPTER 4
PROGRAMS AND ACTIVITIES THAT SUPPORT SOUTH CAROLINA'S NPS MANAGEMENT

a. Section 319 Grants

The Clean Water Act of 1987 (CWA) states: **"It is the national policy that programs for the control of NPSs of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and NPSs of pollution."** This legislation points out the importance of controlling NPSs of water pollution. With the enactment of Section 319 of the CWA, new direction and significant federal financial assistance for the implementation of state NPS programs was authorized. The CWA authorized financial assistance for implementing the Sate's NPS Management Program through annual grants. The Management Program provides the framework for determining what activities and projects are eligible for funding under Section 319. In South Carolina, all funds spent using Section 319 grants must be linked to a stated goal or objective of the NPS Management Program. At the same time, the implementation of the state's Program is a continuous process and must account for available resources, emerging problems and causes within the state, institutional changes, and implementation progress.

i. Description

The state began receiving annual Section 319 grants beginning in FiscalYear 1990. That year, South Carolina received just over $590,500 to implement its NPS program. The allocation has steadily increased in subsequent years and in FY 1999, the state's allocation reached $3,115,600. This amount represents a two-fold increase over 1998, and includes incremental funding in support of the Clean Water Action Plan, awarded for the first time in FY 1999. Incremental funds are used according to the state's Watershed Restoration Action Strategy (WRAS) described in Chapter 3 of this document. The Section 319 grant funds represent sixty percent of the total financial resources spent. The state matches the Section 319 federal funds with a minimum of forty percent state and other non-federal sources.

Each year the SCDHEC NPS staff develops a comprehensive workplan that contains activities and projects that implement the goals and objectives of the NPS Management Program strategy. The total amount of funds requested equals the state's annual allocation of Section 319 funds for that year. Approximately fifty percent of the funds are used for statewide or "institutional" activities. Many of these activities are conducted within the agency and include NPS monitoring and assessment, agricultural animal facility BMP compliance, sediment control BMP compliance, land application of waste BMP compliance, forestry BMP compliance, watershed management, NPS outreach and education, Section 6217 coastal program implementation, and NPS program management and administration.

The following specific, expeditious milestones will be completed under the 319 grant program:

Milestone	***Complete***
Prepare, submit to EPA, and manage Section 319 workplans	1999-2003
Close out 2 Section 319 grants	1999

ii. Strategy for use

Section 319 funds are also made available to a variety of agencies and organizations for NPS projects through a competitive grant proposal process. Annually, South Carolina awards agencies and organizations

a portion of Section 319 grant funds through a formal competitive request for proposals. The NPS Grant Guidance is promoted through various meetings, workshops, advertisements, mailings and on the agency's web page.

In addition, SCDHEC advertises annually in the publication *South Carolina Business Opportunities* (SCBO). SCBO is a compilation of proposed procurement for construction, information and technology; requests for proposals, supplies, and services; and other information of interest to the business community. A copy of *NPS Grants Guidance* is mailed to all interested parties that inquire about the program.

The guidance is also distributed to the State NPS Task Force. The Task Force is a group of water pollution experts and stakeholders who provide direction to the NPS program. In addition, a pre-proposal workshop is held annually for all who are interested in competing for funds, including SC Soil and Water Conservation Districts. The focus of the meeting is to inform and to assist with the proposal process. SCDHEC Watershed Managers also are available to provide assisstance to potential grantees in developing appropriate proposals.

Within the Priority Watersheds (see Sec. 3.d), projects targeted toward correcting problems in impaired waters will be weighted heavily in the project review process. Impaired waters are those included on the 1998 Priority Ranked List of Waterbodies Targeted for Water Quality Management Action, also known as the 303(d) list. Examples of recommended project types are included in the *NPS Grants Guidance*. Projects are required to provide appropriate monitoring and/or functional measures of success in order to gauge effectiveness.

For the project review process, grant proposals are submitted to SCDHEC annually. The NPS Coordinator and the NPS Grants Coordinator review the proposals and divide them into two categories for evaluation. These categories are implementation and assessment. A proposal workbook is assembled with copies of the grant proposals, score sheets with numerical criteria, *NPS Grant Guidance* and other information necessary for review.

This workbook is provided to the ten-member review committee. Members represent the SCDHEC Bureau of Water, SCDHEC Office of Ocean and Coastal Resource Management, and the SC Forestry Association. Individual members also have expertise in various NPS categories such as agriculture, urban activities, wetlands, forestry, land application of waste, hydrologic modification, and water quality monitoring. The committee evaluates all proposals and ranks them using quantifiable criteria. The reviewers' individual score sheets are then averaged. The NPS Grants Coordinator prepares a summary sheet by category listing the proposal number, proposal title, lead agency, federal amount requested, non-federal amount, project duration, and the proposal rank.

During the award process, the committee meets to review the summary sheets and to discuss the strengths and weaknesses of the top ranked proposals. The committee uses the summary of scores and committee members' expert opinions to rank the grant proposals to be awarded Section 319 funds. Typically, annual funding requests far exceed available grant money, therefore only top ranked proposals are funded.

The selected proposals are combined with SCDHEC's base program to form a draft NPS workplan. The Division of Water Quality Director then reviews the workplan. After this initial review for program consistency, it is then forwarded to the Chief of the Bureau of Water for approval. When finalized, the workplan is submitted to the Environmental Protection Agency, along with an application for final project selection and funding approval.

The Department distributes Section 319 funds through a grant/contract agreement. This process is not initiated until EPA awards the funds to SCDHEC. The entire selection and contract award process routinely takes one year from the date of submission of proposals.

b. Section 6217 Coastal Nonpoint Pollution Control Program

i. Description

The Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 included Section 6217 which required states with approved coastal management programs to develop and implement a Coastal Nonpoint Pollution Control Program (CNPCP). This program builds on existing coastal management and NPS pollution programs to reduce and prevent coastal water quality problems. The program is administered jointly at the federal level by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA). The South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resource Management (OCRM) is the lead state agency responsible for the Coastal Nonpoint Pollution Control Program. For purposes of the Section 6217 program, the coastal zone includes Horry, Georgetown, Dorchester, Berkeley, Charleston, Colleton, Beaufort, and Jasper counties. OCRM is working cooperatively with the 319 NPS staff in DHEC's Bureau of Water, and with other agencies, to implement this program.

Section 6217 requires state Coastal Nonpoint Pollution Control Programs to have enforceable mechanisms and/or policies to ensure implementation and compliance with the program objectives. The term "enforceable policy" has been defined by NOAA and EPA as "state policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a state exerts control over private and public land and water uses and natural resources in the coastal zone". These enforceable mechanisms can be either regulatory or non-regulatory. Non-regulatory approaches must be backed by enforceable state authorities which ensure that the management measures will be implemented. States must demonstrate that they have the authority to take enforcement actions where incentive or other non-regulatory programs do not result in implementation of management measures, or where significant harm to coastal waters is found or threatened. South Carolina is utilizing a combination of both regulatory and non-regulatory approaches.

The state's Nonpoint Source Management Program incorporates the elements and requirements of Sections 319 and Section 6217. The NPS pollution categories addressed by Section 6217 are not identical to those addressed by the 319 NPS Program. The federally designated NPS categories and subcategories to be addressed under Section 6217 are listed below, along with the equivalent Section 319 category or categories.

Sec. 6217 NPS Category	**Sec. 319 Equivilent Category**
Agriculture	Agriculture

Sec. 6217 NPS Category	Sec. 319 Equivilent Category
Forestry	Silviculture
Urban Areas	Construction, Urban Runoff, portion of Land Disposal that includes onsite disposal systems
Marinas and Recreational Boating	no equivalent
Hydromodificaton	Hydrologic/habitat Modification
Wetlands, Riparian Areas, and Vegetated Treatment Systems	no equivalent
no equivalent	Resource Extraction
no equivalent	Land Disposal

ii. South Carolina's Program

Initially submitted in 1995, the program was conditionally approved by NOAA and EPA on February 23, 1998. It focuses resources on preventing and controlling significant impacts of NPS pollution on coastal resources and human health. Coordination and integration of coastal nonpoint programs with other programs and water quality initiatives [e.g., state 319 NPS programs, the development of Total Maximum Daily Loads (TMDLs) under Section 303(d) of the Clean Water Act, the Environmental Quality Incentives Program under the 1996 Farm Bill, National Estuary Programs, and State Watershed Plans] are considered in establishing priorities and developing strategies.

In establishing priorities, South Carolina's program addresses pollution prevention and water quality improvement goals, including the protection of pristine areas and coastal waters that are threatened by reasonably foreseeable increases in pollution loadings from new or expanding sources. Targeting program resources involves a balance between the need to implement NPS controls broadly and the need to address specific water quality problems for particular watersheds.

SCDHEC OCRM prepared a 15-year program strategy that describes the state's overall approach and schedule to ensure implementation of management measures for the categories described above, and improve water quality within 15 years of the date of conditional approval. The strategy focuses on meeting CZARA requirements in the coastal zone. Additionally, a five-year implementation plan was developed to provide detailed milestones for meeting overall program goals in the coastal zone. It describes voluntary or incentive-based programs, backed by existing state enforcement authorities. See Section 3.e. for a complete description of the CNPCP strategy and implementation plan.

c. NPS Education and Outreach

i. Strategy

NPS pollution is frequently the result of actions by the general public within communities and/or watersheds. As a result, reductions can only be achieved through educational efforts targeted at changing attitudes and behavior of individual citizens. The South Carolina NPS Management Plan recognizes that effective and comprehensive public education and participation is an important requirement for success of the state's NPS Pollution Management Program. The state's NPS education and outreach strategy revolves around efforts to educate South Carolina's school children and adult populations about watersheds and NPS pollution prevention. Activities are aimed at improving the public's awareness and knowledge of NPS water pollution issues and the responsibilities of individual citizens in controlling and preventing this problem. The strategy is to first reach out and educate, then to stimulate action, and finally offer rewards where possible for achievement in implementing NPS and other environmental projects.

NPS education strategies for some specific categories such as Forestry are described elsewhere in this document. However, there is no explicit, overall strategy for educating the agricultural community about reducing and preventing NPS pollution. Since agricultural activities and impacts are widespread throughout the state, a strategy will be developed. It will include use of the *Farming for Clean Water* BMP manual as a component.

To accomplish the strategy described above, three NPS educators on staff within SCDHEC's Bureau of Water provide specific NPS outreach efforts. They participate in NPS related events, meetings, seminars, etc. making presentations or using the portable NPS education exhibit. Various media are also employed to get the NPS message out including television, radio, Internet, and print.

Educating the state's school children about NPS and its prevention is a high priority. This is accomplished by educating teachers as well as students. NPS staff regularly make presentations in the classroom, often employing a tabletop watershed model, and participate in the teachers workshops.

Other programs within SCDHEC's Bureau of Water that complement the NPS education and information activities performed by NPS outreach staff, include education efforts for Source Water Protection, Well Head Protection, and drinking water protection and treatment. Also, many projects related to NPS education and information have been implemented by other agencies and organizations using Section 319 grant funds. Some of these projects are statewide in scope, while others aim to educate and inform citizens within a particular watershed.

ii Activities

Specific activities and projects related to NPS education and information have resulted in specific products. They are described below.

NPS Newsletter
Turning the Tide was developed to provide current NPS project and program information to a wide audience including municipal officials, other state agencies, and interested citizens. Articles are submitted from both DHEC and other state agencies, non-profit groups, and other professionals and may be technical or nontechnical. *Turning the Tide* has a quarterly mailout of 3200 issues. The NPS

program continues to expand its mailing list and solicit articles related to NPS that would be of interest and educational value to it's diverse reading audience.

Community Education
To develop awareness among homeowners, NPS related materials (brochures, fact sheets, etc.) are developed or ordered and distributed at fairs, presentations, lake association meetings and upon request. All NPS presentations are tailored to meet the experience level of the audience and generally include hands-on activities, audio-visuals and educational literature. When crowd size permits, the Enviroscape® model is used to help explain the concepts in a visual manner that isn't possible with slide shows or discussion. NPS informational displays are also developed and utilized for fairs and festivals.

NPS outreach awareness and reduction articles have been published in *The DHEC Newsletter*, *Turning the Tide* newsletter, and South Carolina's Sierra Club publication *Congaree Chronicle*. Also, a half page ad in *The State* (Columbia newspaper) describing NPS outreach and other water education programs at DHEC was produced through the NPS outreach program.

Pollution Prevention
Community education is developed on the premise that a pollution prevention program is the key to source reduction. The program goals are to encourage the adoption of NPS pollution prevention techniques and practices by homeowners through a variety of media, presentations and other outreach activities.

NPS Prevention and Promotion through Radio & TV
Multi-media outreach through the NPS program has included both television and radio. NPS television scripts have been written and produced for a locally broadcast environmental news program called "Code Green". The NPS education coordinator has also appeared as a guest panelist on a live, statewide television broadcast of a SCETV program "Earth and Us", discussing nonpoint pollution and answering viewers questions.

Monthly paid public service announcements are written and managed by the NPS outreach program. These statewide radio spots are run 10 times a month with different NPS messages broadcast each month covering a one year period. They are broadcast on AM radio in an effort to target rural as well as urban audiences.

Continuation of multi-media outreach is planned with potential bill boards, more TV coverage and newspaper and popular press coverage. In addition, the NPS program will contribute to the Bureau's Internet site.

Teacher Education
An important component of the NPS outreach program is educating teachers. By providing the NPS message to teachers, many more students in South Carolina can be reached. The program has utilized classroom demonstrations, participation in school fairs, and participation in teacher workshops. Water education packets were developed and distributed to teachers participating in workshops and those requesting classroom presentations or information. The Enviroscape® watershed model is an integral part of concept presentation.

Another effective method for educating teachers is actively seeking and engaging in partnering opportunities with other agencies. The NPS outreach program participates in the SC Envirothon (sponsored by SC Department of Natural Resources, and Natural Resource Conservation Service), and

the Conservation Station (sponsored by SCDHEC, NRCS, and Clemson University Extension). The SC Envirothon is a statewide environmental knowledge competition for high school students. The Conservation Station is a series of self-explanatory, interactive kiosks in a woodland setting with different environmental themes. It is anticipated that regional teachers will utilize this facility for outdoor, hands-on instruction on conservation issues. It is important that existing environmental education networks continue to be utilized to avoid "re-inventing the wheel".

NPS Information Exchange Conferences

A great deal of useful data and information has been gained from the implementation of the state's NPS Management Program over the years. To share that information with the interested community, the first in a series of NPS Information Exchange conferences was held over two days in April of 1998. The conference had as its theme "What We've Learned So Far" and was jointly sponsored by SCDHEC and the SC Dept. of Natural Resources. Over 100 representatives from federal and state agencies, academia, industry, and citizens groups were in attendance to listen to presentations, network, and view the poster session. Topics ranged from the restoration of the Pocotaligo Swamp to assessment of risk reduction strategies for the management of agricultural NPS runoff to estuarine ecosystems. A very positive response was received from an evaluation survey of participants conducted after the conference.

Due to the success of the 1998 conference, similar events are planned for future years. In March of 1999, SCDHEC, using Section 319 grant funds helped sponsor the North American Lakes Management Society, Eighth Annual Southeastern Lakes Management Conference. This meeting was held in Clemson, South Carolina. The theme of the conference focused on watersheds and NPS. Several SCDHEC NPS staff made presentations over the four-day conference. It is anticipated that NPS Information Exchange conferences will be continued on an alternating year basis.

Champions of the Environment Student Recognition

Champions of the Environment is a recognition and rewards program established primarily to encourage youth to continue implementing NPS reduction techniques and pursuing NPS education and awareness. The program also encourages teachers to continue teaching and leading students in NPS education, awareness, and action. By broadcasting students' environmental messages to a statewide television audience, South Carolina's adult population is also exposed to NPS education messages.

In addition to Section 319 NPS funding for these programs, funding comes from partnerships formed within the agency and with private sector businesses. Intra-agency partnerships enable better communications among outreach programs as well as lead to new contacts and schools that can participate in Champions of the Environment. The private sector business partnerships enable the program to broadcast its message more frequently and provide additional rewards and recognition to the students, such as savings bonds, T-shirts, and medallions. In addition to SCDHEC, the partnership consists of DuPont, Union Camp, and WIS-TV.

Champions of the Environment is composed of two parts. The Monthly Scholarship Recognition Program, which began in 1994, provides student recognition and public awareness of NPS issues. During the school year students and teachers at all grade levels are recognized for their outstanding environmental achievements. Their NPS work is highlighted in a 30 second television spot that is produced and broadcast by one of the private sector business partners. These television spots reach a statewide audience of over 500,000 households. In addition to the television spots, students also receive $100 savings bond scholarships, T-shirts, and medallions. A kick-off event and an awards ceremony are conducted to create additional interest and recognition for students. These functions provide additional

statewide NPS recognition, including the appearance and endorsement of the Governor of South Carolina, and television coverage. At the end of the school year, the most outstanding monthly Champions are selected and recognized as the Yearly Champions of the Environment. These yearly Champions of the Environment receive a $1000 savings bond scholarship. Each year 15 to 21 individual students, student groups, or clubs are honored as monthly Champions of the Environment, and 3 to 4 of these monthly Champions are named as Yearly Champions of the Environment. No federal funds are utilized to furnish savings bonds or promotional items. They are provided through the generosity of the private participating partners.

The second component of Champions is the South Carolina Environmental Awareness Competition. It is an annual competition open to South Carolina's sixth, seventh, and eighth graders. Created in 1993, this middle school competition takes place in the spring and consists of five different events: Environmental Essay, Environmental Photography, Environmental Poster, Environmental Spokesperson, and the Environmental Quiz Bowl. The competition has a different theme each year allowing students to display both talent and environmental commitment. Each event recognizes one winner and four finalists. All winners and finalists receive T-shirts and medallions. Savings bond scholarships worth $300 and $100 are awarded to event winners and finalists, respectively. Each year over 300 middle school students from all over South Carolina participate. With this competition, students not only show their commitment to South Carolina's environment, but interact with other students, teachers, and professionals and learn more about NPS and other environmental protection issues.

Use of media, especially television, has been a major outreach tool. A 30 second application spot is produced and aired by the local NBC affiliate at the beginning of the school year. The monthly television spots also serve as a method to attract increased participation. Champions of the Environment has broadcast program information on "Code Green," a television news segment that airs twice a week. For each monthly champion and each Champions of the Environment event, press releases are issued. These press releases have resulted in media coverage by television, radio, and newspaper.

A Champions of the Environment Internet site has been established and is updated regularly. Tracking the number of website "hits" has indicated that the NPS message is reaching a growing audience. By including application forms on the webpage, the website has generated increased program participation. The address is **www.state.sc.us/DHEC/champion.htm.**

Action for Cleaner Tomorrow NPS Curriculum

Action for a Cleaner Tomorrow: A South Carolina Environmental Curriculum includes an NPS curriculum for grades K -12. "Action" is an interdisciplinary curriculum supplement that provides hands-on activities and lessons. The kindergarten through 12th grade curriculum supplement offers lessons in four main subject areas: air, energy, solid waste and water. More than 8,000 teachers have attended workshops on "Action" since the curriculum supplement was introduced in 1993.

South Carolina Home*A*Syst

This outreach program was developed by Clemson University Cooperative Extension, using Section 319 funding, to educate watershed residents and encourage them to implement responsible homestead management practices for NPS prevention and control. South Carolina Home*A*Syst helps South Carolina residents protect the quality of surface and groundwater by providing them with information to

identify and remediate existing or potential problems. Common practices in every home, large or small, new or old, rural or urban, create potential pollution sources that can affect the health of individuals, communities, and the environment. The South Carolina Home*A*Syst manual is a valuable reference for anyone who is concerned about their health and the environment and who is willing to make changes to improve how they manage their homes. Program materials help users to implement simple changes in their household practices in order to prevent NPS pollution and help maintain the health of their families and the environment.

South Carolina Home*A*Syst was written to conform with pertinent South Carolina laws and regulations relevant to the specific chapter topics. It advises users that they must also check for and then comply with any local or county regulations.

South Carolina Home*A*Syst was produced as an 84-page, spiral-bound booklet. The five chapters cover topics important for every resident or homeowner to understand in order to protect water quality. Each chapter contains information about the specified topic, and one or more assessment tables to guide users in identifying risky practices around the home. After completing each self-assessment, the user is instructed to refer back to the information preceding it to plans for changes to remedy any risks that were detected. Since the printed Home*A*Syst guide cannot answer all questions for all homestead situations, lists of additional references and agency contacts are provided at the end of each chapter.

Four thousand copies of South Carolina Home*A*Syst were printed in April, 1998, and were disseminated within a year, through local community meetings, statewide conferences, and regional conferences. South Carolina Home*A*Syst is currently available for distribution at the Clemson University Bulletin Room and at Cooperative Extension County offices statewide. An interactive version of South Carolina Home*A*Syst is being prepared for dissemination via the Internet.

Water Watch

The Water Watch program is designed to involve the public and local communities in water quality protection. This program was developed to encourage SC's citizens to become stewards of the state's lakes, rivers, streams, estuaries and wetlands. Volunteers select a water resource on which to focus and perform activities aimed at protecting water quality. In addition, the Water Watch Coordinator has spent much of the past year making presentations throughout SC about NPS issues, particularly to youth.

The purpose of the activity is educating a variety of groups about NPS pollution and the citizen's role in its abatement through a concept called Water Watch. A total of 28 local Water Watch chapters have been established statewide. An estimated 2700 people heard the NPS message through the conduct of Water Watch meetings during 1998. Other avenues used to distribute information were: Code Green segment "What is Water Watch?", a mass mailing in conjunction with the SC Dept. of Natural Resources, mailed and voice responses to many requests for information, completion of the Water Watch website, installation of activities and an information kiosk at Sandhills Research and Education Center, distribution of NPS teacher packets at most events, exhibiting the Water Watch display board at conferences and meetings, contribution of quarterly articles to "Turning the Tide" and publishing of a monthly "Water Watch Update" newsletter.

Ongoing communication and contact is maintained with existing groups through the monthly newsletter *Water Watch Update*, which has just reached the 10th issue. Annually, an "Activity Report Form" is sent out so that all groups can keep DHEC appraised of their progress. The coordinator is available to

any group who needs help, and has been called on frequently to do so, including helping with activities such as trash pick-ups and pontoon boat classroom instruction.

Activity packets available to Water Watch Groups include Conducting a Tree Planting Activity, Conducting a Stormdrain Stenciling Project, Conducting a Shoreline Survey, Conducting a Litter Cleanup, Conducting a Biological Monitoring Survey, Macro invertebrates for Elementary, Macro- invertebrates for Middle and High, Teacher Resource Packet, and Site-specific Watershed Packet. Several other resource materials and activities have been produced and implemented. A special Water Watch Guidebook for school groups was produced that incorporates NPS curriculum for use in the classroom. A NPS activity book using a fish as the main character is in process. A stream habitat assessment guide and macroinvertebrate identification and scoring sheets were adapted for Water Watch use. A flier on proper dog waste disposal was created that has proven most popular! The watershed model was adapted to show BMPs in use, and there are several new visual aids for use in talks. The Water Watch display board has undergone a complete renovation to provide more NPS information and encourage people to use DHEC information to assess the quality of their local waterbody.

Lake Fairs

Lake Fairs serve the following purposes:

- A technique to improve the general public's understanding of water quality issues
- A subtle way to deliver educational material to the public
- A strategy to integrate presentations of several educational messages
- An education event in the guise of entertainment
- An event that allows participants to gain hands-on experience and talk to experts in an informal setting
- A method to meet new people and build relationships within the community
- A pleasurable way to discover more about NPS pollution threats to water quality, while enjoying a day with friends and family
- Can be a means for local organizations to earn funds
- A two-edged sword, educating both attendees and exhibitors.

Each Lake Fair takes on a unique character, keyed to local water quality and watershed issues, and to the particular needs of the community. South Carolina is at a critical turning point in water and watershed management. Over the last ten years, residential development around the shores of this state's lakes and reservoirs has increased tremendously. The potential NPS pollution inputs from these developments can damage water quality. In many of these lakeshore communities, local lake associations are now recognizing the need to protect water quality by altering homestead management practices. But this heightened awareness needs to be communicated to the wider population, including local government officials, within each watershed. Lake Fairs provide a mechanism for encouraging community awareness and thus making protecting water from NPS pollution a community priority.

In June of 1998, Clemson University Extension, with the support of many local collaborators and a Section 319 grant, produced the first Lake Fair in South Carolina. This event was held on the shores of Lake Wylie in York County. The success of this event was demonstrated when the community decided to host a 1999 Lake Fair, without the benefit of Section 319 funds. A second Lake Fair is planned for Goose Creek Reservoir, in Berkeley County, in the late Summer of 1999. These two Lake Fairs will serve as models for other such events throughout South Carolina and the Southeastern United States. After completion of the Goose Creek Reservoir Lake Fair, this project will produce a publication, for dissemination statewide, which describes how to host a Lake Fair. "How to Host a Lake Fair" will include information on organization, recruiting volunteers, budget, state-wide contacts

for exhibitors (private and public groups) and the resources available for Lake Fairs from Clemson University Cooperative Extension. This information will also be made available on a Clemson Extension Web page, to allow for computer access.

NPS Education for Municipal Officials (NEMO)
Originally developed by the University of Connecticut Cooperative Extension, this program is a three tiered informational, educational and technical assistance strategy for protecting local water quality by linking land use decisions with NPS pollution. This program has been adapted for use in South Carolina through a collaboration between the SC Sea Grant Extension Program, the Waccamaw Council of Governments (COG), and the Clemson Extension Service. The Objective of NEMO is to inform and educate local officials on how local land use decisions and NPS pollution are inextricably linked, in an effort to have NPS pollution considered more when land use policy decisions are made. By utilizing Geographic Information System (GIS) technology, NEMO makes this link by demonstrating that an increase in impervious surface coverage, which is assumed to be an inescapable result of growth, results in an increase of NPS pollution. By using a zoning-based "build-out" analysis of impervious surface growth, NEMO projects possible future NPS problems in watersheds.

NEMO is an NPS focused program with educational and technical assistance that enables local planners and other decision makers to incorporate NPS concerns into their decision making process. The program begins by introducing the "basics" of NPS pollution via a videotape. The program emphasizes the critical land use/NPS connection utilizing local GIS images and maps. Also, it offers suggestions for local officials to consider when making land use decisions. When local planners see the effects their land use decisions have on water quality through colorful GIS-derived maps and slides, they will better understand the "hidden impacts" of NPS pollution locally.

The NEMO program shows local government officials in the watersheds that water quality cannot be treated as a stand-alone issue divorced from other local quality of life considerations such as urban sprawl, traffic, road maintenance, open space planning and the character of neighborhoods. NPS pollution should be an issue addressed in combination with these other issues. In this way, NEMO serves as a catalyst for change by enabling local officials to better incorporate water resource protection into their everyday decisions.

Products developed as part of the NEMO project include a series of fact sheets for South Carolina. These informational sheets cover several topics, from how to raise a nonpoint or runoff related issue at a meeting, to establishing a practical methodology for open space planning.

Logger Education
A Timber Operations Professional (TOP) program for logger accreditation is offered in South Carolina. The Program is a joint effort of the South Carolina Forestry Association, the SC Forestry Commission, Clemson University Extension Service and the State Board for Technical Education. Three 8-hour sessions are taught: Forestry BMPs, OSHA approved First Aid and Safety, and Business Management. Loggers must attend all three sessions in order to receive accreditation. The course is offered at technical colleges in the state at least three times each year, and additional sessions are held upon request for forest industry and landowner groups. As of October 1998, 45 TOP programs have been held, and 1,235 loggers, foresters, and forest landowners have completed the course. The program is open to logging company owners and foremen. The cost of attending the complete course is $150. This program is supported by many forest industries, who are encouraging their contract loggers to become accredited.

Coastal and Marine Resources Education
The SC Sea Grant Consortium facilitates innovative research, education and extension activities which seek to address major issues, problems, and opportunities and to increase the knowledge and understanding of marine and coastal resources in the state. The Consortium, through its integrated Sea Grant Extension Program, provides technical, educational, and financial assistance on NPS pollution issues to individuals and organizations throughout the coastal zone and beyond. The Consortium acts as an information broker whereby user needs are identified and form the basis for research and education projects. Results are subsequently communicated back to those users through a variety of established mechanisms. Programs are conducted with numerous cooperating partners including the National Oceanic and Atmospheric Administration, the US Environmental Protection Agency, and the US Department of Agriculture.

Demonstrations as part of Section 319 Projects
Many Section 319 projects contain an education or demonstration component. For example, a project component may be to construct and demonstrate an innovative best management practice (BMP). Examples include agricultural BMPs such as composter, cattle ramp and other cattle exclusion techniques, conservation tillage, and site-specific farming. Other projects have demonstrated alternative treatment for conventional onsite septic systems, constructed wetlands to collect and treat stormwater runoff, and riparian buffers. Demonstrations are normally held at the project site during organized field days. The agency/organization implementing the project provides the publicity connected with the field day.

iii. NPS Education/Information Publications

The following listed publications are available upon request and are distributed widely. Descriptions of the publications are provided elsewhere in this document.

- ***Turning the Tide: A Citizen's Guide to Reducing NPS Pollution***
- ***Septic System Homeowners Guide & Record Keeping Folder***
- ***Farming for Clean Water***
- ***Wetland Restoration: An Alternative Way to Treat NPS Pollution***
- ***Unpaved Public Roads BMP Demonstration Guidelines for Sediment and Erosion Control***
- ***SC Home*A*Syst: An Environmental Risk-Assessment Guide for Protecting Water Quality***
- ***South Carolina's Best Management Practices for Forestry***
- ***Beneficial Use of Wastewater Solids: SC Guide for Land Application of Wastewater Sludge***
- ***Water Quality Awareness for Horse Owners***

d. Water Quality Monitoring and Assessment

i. Monitoring and Assessment Strategy

Under the SC Pollution Control Act and the federal Clean Water Act, SCDHEC undertakes certain water quality monitoring responsibilities. Regulatory monitoring, water quality assessment, and data evaluation are conducted to fulfill these responsibilities. Data collected is used for various purposes

including identifying waters not fully meeting designated uses due to NPS pollution, assessing the effectiveness of NPS controls, and enforcement activities. Results of the agency's monitoring effort is included in the biennial *SC Water Quality Assessment Pursuant to Section 305(b) of the Clean Water Act* and in each Watershed Water Quality Management Strategy, including ambient surface water monitoring, compliance monitoring, groundwater assessment, shellfish waters sanitary surveys, and macroinvertebrate assessments. A *State of South Carolina Monitoring Strategy* is also produced annually that describes the program's fixed monitoring network, intensive surveys and special water quality studies, process for compliance monitoring, quality assurance/quality control procedures, laboratory support, data handling, etc.

Until recently, the primary focus of water quality programs was on the evaluation and correction of point source pollution inputs. However, NPS pollution now presents the greater threat to water quality, and increased emphasis now must also be placed on identifying, assessing, and monitoring NPS inputs into the waters of the state. In order to accomplish the goals of the NPS Management Program, in particular the Watershed Restoration Action Strategy (WRAS), a revised assessment and monitoring process and new NPS initiatives and strategies are being developed and implemented. The following activities are implemented as part of the strategy for NPS monitoring and assessment.

- SCDHEC monitoring staff assess watersheds impacted by NPS that are on the state's 303(d) list
- provide water quality monitoring for assessment and evaluation of effectiveness of Section 319 watershed projects

- conduct water quality and bioassessment evaluations of NPS impacts to assist in the design and implementation of reconnaissance activities. Results of reconnaissance activities will then be used to further screen impacted streams, rivers, and lakes and to identify specific pollution contributors and locations, leading to corrective action plans

- provide technical monitoring assistance to the SCDHEC Bureau of Water and EQC District staff in complaint investigations and enforcement referrals

ii. Surface Water Monitoring Program

In an effort to evaluate the state's water quality, the Department operates a permanent statewide network of ambient surface water monitoring stations. The ambient monitoring network is directed toward determining long-term water quality trends, assessing attainment of water quality standards, identifying locations in need of additional attention, and providing background data for planning and evaluating stream classifications and standards.

Biological trend monitoring is also conducted to collect data to indicate general biological conditions of state waters which may be subject to a variety of point and nonpoint source impacts. In 1991, the Department began using ambient macroinvertebrate data to support the development of Watershed Water Quality Assessments. Ambient sampling is also used to establish regional reference or "least impacted" sites from which to make comparisons in future monitoring. Additionally, special macroinvertebrate studies, in which stream specific comparisons among stations located upstream and downstream from a known discharge or nonpoint source area, are used to assess impact.

South Carolina's coastal area consists of 579,691 acres of surface water with an assigned classification designated for the harvest of molluscan shellfish. This coastal area is divided into 23 shellfish

management areas with a total of 468 monitoring stations. The purpose of this monitoring network is to provide data which accurately reflects the sanitary conditions of coastal shellfish and shellfish growing waters in South Carolina to ensure that the health of shellfish consumers is protected.

During a five-year assessment period, DHEC collects data from over 1300 locations around the state. Water quality data are used to describe the condition of a waterbody, to help understand why that condition exists, and to provide some clues as to how it may be improved. Water quality indicators include physical, chemical, and biological measurements.

Macroinvertebrates are aquatic insects and other aquatic invertebrates associated with the substrates of waterbodies (including, but not limited to streams, rivers, lakes, tidal creeks, and estuaries). Macroinvertebrates can be useful indicators of water quality because these communities respond to integrated stresses over time which reflect fluctuating environmental conditions. Community responses to various pollutants (e.g., organic, toxic, and sediment) may be assessed through interpretation of diversity, known organism tolerances, and in some cases, relative abundances and feeding types.

iii. Monitoring to Determine Effectiveness of Section 319 Funded Projects

Water quality monitoring is a vital source of information for identifying problems, assessing impacts, and evaluating improvement efforts. The SCDHEC Water Quality Monitoring Section (WQMS) and Aquatic Biology Section are involved in a variety of monitoring projects, from one-time biological assessment sampling, to three-year watershed surveys. These project objectives include the identification of NPS problem areas; assessment of impacts on water quality, designated uses, and biological communities; and the evaluation of efforts to reduce or prevent NPS pollution. These projects are often cooperative interagency efforts for which these Sections answer some or all of the monitoring needs. Monitoring parameters include water chemistry, flow measurements, nutrient and bacteria levels, turbidity and suspended solids data, and macroinvertebrate community assessment.

Currently, several monitoring projects are evaluating the effectiveness of BMPs in the reduction of NPS impacts. Projects underway in the Stevens Creek Watershed (Greenwood and Edgefield Counties) and Coneross Creek Watershed (Oconee Co.), incorporate implementation and monitoring of primarily agricultural BMPs. Management practices being implemented throughout the watersheds include a variety of practices for row cropping and confined animals (poultry). Strategically located monitoring stations throughout the watershed will help to determine the effectiveness of the BMPs. Monitoring in Stevens Creek Watershed began January 1996; monitoring in Coneross Creek Watershed began January 1997. Both will continue until December 1999.

A project demonstrating streambank restoration techniques is ongoing in the Reedy River watershed (Greenville Co.). Streambank stabilization BMPs are be implemented and evaluation monitoring is being conducted over a 24 month period. Monitoring began March, 1998 and will continue until March, 2000. To evaluate the effectiveness of a silvicultural BMP demonstration site in Pickens County, a two year monitoring regime began in October, 1997. Logging related BMPs at the Four Mile Creek site include piped stream crossings, riparian management zones, water breaks, and road improvements.

Sampling for the New River Study (Jasper and Beaufort Counties) began in February 1996, to investigate citizen complaints and to assess NPS impacts of a large urban development under construction on Hilton Head Island. Since that time, a Section 319 grant was awarded to the Lowcountry Council of Governments to investigate land use and implement BMPs. Water quality monitoring is scheduled to continue through early 1999.

A wetlands restoration demonstration project in the Pocotaligo Swamp Watershed is now nearing completion. Monitoring conducted January 1995 through February 1997 was used to evaluate reclamation efforts to increase flow in the swamp. The final project report will be finished in 1999.

iv. Special NPS Assessment Projects

Ecoregion Delineation

The SCDHEC Aquatic Biology Section, cooperatively with EPA, is developing a useful geographic framework that characterizes sections of South Carolina into logical units of similar geology, physiography, soils, vegetation, land use/land cover and water quality, called ecoregions. Ecoregions have been delineated at a national scale, called Level III. Refining Level III ecoregion boundaries and defining the more detailed Level IV ecoregions in South Carolina allows a more explicit definition of attainability and aquatic life uses. The ecoregional framework is useful to meet present and future requirements of EPA's standards in the development of biological criteria. The development of these ecological regions is important because the structure and function of many aquatic biological communities varies in differing geographic areas. Once the framework has been developed and is in-place, biological assessments may become standardized and thus more easily facilitated and evaluated. Biological assessments are a component of the majority of DHEC's NPS monitoring studies.

An initial ecoregion meeting was held in February 1999. Representatives from DHEC, NRCS, EPA, Clemson University, USDA Forest Service, and Nature Conservancy shared data and discussed project design. A contractor with knowledge and experience in the ecoregion concept has reviewed draft ecoregions with scientists from around the state, and worked with them to select the initial set of candidate reference sites. The contractor will also review existing reference sites to ensure consistency across state borders and with other projects in the Southeast. A key objective of this project is to obtain consensus among EPA, NRCS, and USDA Forest Service on alignment of ecological regions.

Following eco-regionalization, implementation of biological criteria requires the selection of least impacted reference sites in each of the defined ecological regions. Characterization of resident biota inhabiting those reference sites establishes baseline, best attainable reference conditions representative of each ecoregion. Over time, narrative or possibly numeric biological criteria can be established based on the reference conditions. Once biocriteria are developed, assessments of biological integrity and habitat evaluations performed at potentially impacted sites will be compared to the reference site conditions for determining relative impact and aquatic life use attainability. If impairment is found, the diagnosis of cause will lead to the implementation of control or corrective action (i.e., best management practices). Continued monitoring should determine the effectiveness of intervention on an impacted site or ensure that the surface water quality is maintained or improved.

As part of the project, candidate wadeable reference sites will be selected. Data collected at base reference sites will be useful for developing ecoregion-specific biological criteria. Ecoregion frameworks have a profound influence on the effectiveness of assessment and management of many water resource problems, particularly NPS impairments. Information collected at reference sites provides an effective tool for sorting proportional impacts in NPS studies, for assessing the effectiveness of best management practices, for identifying high quality waters and for managing areas to preserve biological diversity. This project is also fostering interstate and interagency cooperation for ecoregion delineation and in selecting and sampling reference sites in ecoregions shared with neighboring states of Georgia and North Carolina. Specific outputs include a multi-state map poster produced by NRCS and EPA of Level III and IV ecoregions of South Carolina, Georgia, and Alabama and will include a map of ecoregions; descriptions, tables, and color photographs of distinguishing

characteristics; list of references and contributors. Digital ARC/INFO GIS coverages of South Carolina ecoregions and a list of candidate reference sites for each Level IV ecoregion will also be provided.

Identification and Determination of Fecal Coliform Bacteria Sources

Of the impaired waters listed on the state of South Carolina 303(d) List for 1998, approximately 80 percent are listed because of fecal coliform bacteria standards violations. Also, all non-administrative coastal shellfish harvesting closures are due to fecal coliform bacteria standards violations. Crucial to any plan to achieve standards compliance is an understanding of the probable sources of the fecal coliform bacteria, i.e. human, domesticated animals, or wild animals. There are several tools that can aid in this process. One relatively simple and inexpensive test is Multiple Antibiotic Resistance (MAR). By isolating *Escherichia coli* strains from positive fecal coliform results and exposing them to an array of antibiotics and measuring their growth, it is possible to begin to identify the original host of the bacteria. This can help focus corrective actions at the specific source of the problem: leaking septic tanks, wastewater discharges, livestock and animal operations, pet waste, or wildlife populations. Further discrimination between human and animal populations can be achieved using tests such as typing with ribosomal DNA (ribo-typing) isolated from the *E. coli* strains. Other, more highly specific methods, such as pulse-field gel electrophoresis (PFGE), are available for use as a secondary method when greater resolution is necessary to distinguish between wild and domestic animal populations. SCDHEC will solicit bids for an unspecified grantee trained with the specific expertise to perform these activities. The proposed study will assess the NPS contributions of fecal coliforms at 96 stream stations. An initial pilot study of 1-3 stations will be completed prior to assessment at the remaining stations.

MAR and ribo-typing of samples from each of the 96 stations exhibiting impairment due to fecal coliform and from a major municipal discharger in each of the five priority watersheds identified in South Carolina's watershed implementation strategy (as a human type reference) will be conducted. Results from this first phase of study will identify fecal coliforms as originating from human or animal sources and will be useful in confirmation of single sources in priority two and three waterbodies. PFGE analysis of a second set of samples collected from all stations designated as priority one waterbodies (12 stations), and one Bush River station (priority 2) will be conducted in the second phase of study. These sample stations are impacted by multiple sources and it is expected that higher resolution will be necessary to distinguish between animal and human populations as sources of fecal coliforms. Also, priority two and three stations where previous testing proves inconclusive, may be included in the second phase of testing for additional MAR testing, ribo-typing, and PFGE.

Results of this project will provide useful data in the determination of specific sources of NPS impacts attributable to fecal coliform bacteria. The source of the bacteria (human, domestic animal, wild animal) will in turn help to focus the corrective action or type of best management practices to address the impact. For example, if fecal coliform sources were found to be of human origin, corrective actions might then be focused on addressing septic system failures.

Regional Groundwater Assessment

An assessment currently underway by SCDHEC's Groundwater Management Section is applying to the Pee Dee basin some investigatory principles and efficient methods of testing and evaluation that previously have been used successfully in broad surveys of other regions where suspected levels of groundwater vulnerability are linked to NPS contamination. The process of the Pee Dee basin assessment includes determining two main characteristics on a regional and subregional areal basis: 1) relative vulnerability to contamination of the shallowest principal aquifers, and 2) actual measurable

impacts to groundwater supplies by contaminants (including those below regulatory thresholds). The project is described in more detail in Chapter 7, Section h.vii.

v. QA/QC Requirements for NPS Projects Which Contain a Monitoring Component

A quality assurance program is essential to produce valid data and to provide a means to systematically demonstrate its validity. It is the policy of SCDHEC Environmental Quality Control (EQC) that necessary quality assurance (QA) activities be conducted within the state of South Carolina to demonstrate that all environmental data generated, processed, or used will be scientifically valid, defensible, and of known and acceptable precision and accuracy. It is also the policy of EQC that all reported data will include documented precision and accuracy and be complete, representative, and comparable. The quality of all data generated shall meet or exceed all EQC and EPA program requirements.

The Deputy Commissioner for Environmental Quality Control has the overall responsibility for the development, implementation, and continued operation of EQC's QA Program. To insure that EQC's QA policy is uniformly applied to the generating and processing of all environmental data, a State Quality Assurance Management Office (SQAMO) has been established.

This office is responsible for the Environmental Quality Control Assurance Program. Environmental measurement activities conducted by or for EQC shall be done only with the approval of the State Quality Assurance Management Office (SQAMO) after assuring that adequate quality assurance guidelines and procedures have been incorporated. This includes study-planning, sample collection, preservation and analysis, data handling, and use of physical, chemical, biological, and other data related to the effects, sources, transport and control of pollution, as well as personnel review and training.

To accomplish these goals the Water Quality Monitoring Section, the Aquatic Biology and Facilities Compliance Section have developed and instituted SQAMO approved field study procedures and documentation, data review, and routine EPA operating overview. These procedures are documented in the SCDHEC's ***Standard Operating and Quality Control Procedures for Ambient Water Quality and Wastewater Facility Monitoring, Procedures Manual for Stream and Wastewater Facility Flow Measurement*** , and ***Standard Operating and Quality Assurance Procedures for Biological Services***. These documents describe in detail the field sampling procedures, meter calibration and maintenance procedures, sample chain-of-custody documentation, sample preservation, holding times and recommended sample containers specifications, data sheet examples, and data submission requirements.

All Section 319 funded NPS activities and projects that involve environmental measurements or data generation must have approved quality assurance/quality control procedures. For projects that involve collection and analysis of water quality data, the QA/QC should include a project specific monitoring plan. This requirement is routinely included as a Section 319 grant condition. The condition states that project monitoring may not commence until the QA/QC monitoring plan for the project has been approved. In September of 1998, the Environmental Protection Agency granted SCDHEC the authority to approve these project-related plans by approving SCDHEC's ***Quality Assurance Management Plan*** **(QAMP)**. The QAMP document describes how programs within SCDHEC will plan, implement, and assess the quality of environmental work to be performed as part of various functions within SCDHEC. Minimum requirements for QA/QC plans include a description of the data quality objectives, project description, analytical methods, collection methods, sample custody procedures, data validation,

standard operating procedures, etc. The full text of the quality assurance system components as described in the QAMP is included as Appendix 2.

vi. Monitoring Program Activity Milestones

Specific, expeditious milestones for the statewide monitoring program are described in this Section. Along with monitoring activities that are conducted in specific watersheds, activities that support the statewide NPS Management program will be implemented.

Milestone	Complete
Plan and implement 10 biological assessments annually in order to determine aquatic life support in NPS 303(d) listed waterbodies	1999-2003
Design and implement 2 water quality monitoring studies annually to address NPS problem waterbodies on the 303(d) list	1999-2003
Provide water quality monitoring assistance to SCDHEC Enforcement annually for 15 NPS enforcement investigations	1999-2003

e. Clean Water State Revolving Fund Loans for NPS Projects

i. Program Description

The federal Clean Water Act (CWA) amendments of 1987 authorized a Clean Water State Revolving Fund (CWSRF) to assist states with the financing of publicly owned treatment facilities (Section 212) and NPS management activities (Section 319). Title VI, Section 601 of the CWA authorizes the Administrator of EPA to award capitalization grants to states for the purpose of establishing a low interest loan program to assist eligible CWSRF project sponsors. Under the program, EPA provides "seed money" to states in order to capitalize state loan funds. The states in turn make below- market interest rate loans to eligible entities for projects that remediate water quality problems. To date, most SRF loans have been made to local governments to construct or improve wastewater treatment facilities.

Based on evidence that NPS pollution is now the greatest threat to the nation's waters, EPA would like to see the CWSRF become a major source of funding to address polluted runoff. In creating the CWSRF, Congress ensured that it would be able to fund virtually any type of water quality project, including NPS, wetlands restoration and protection, estuary protection, watershed, and brownfield remediation, as well as the more traditional municipal wastewater treatment systems.

The CWSRF program is managed by the SCDHEC, with financial administration by the State Budget and Control Board (BCB). An applicant for an CWSRF loan is termed a project "sponsor." In South Carolina, an eligible CWSRF sponsor is defined as a county, municipality, special purpose district, commissioners of public works, or any other public agency of the state which may own or operate a project.

The SCDHEC is the designated state agency to apply for and administer the capitalization grant for the CWSRF. The BCB Office of Local Government conducts the financial functions of the CWSRF and

makes loans to project sponsors. South Carolina's allotment of the CWSRF funds appropriated by Congress for Fiscal Year 1999 is $13,796,145.

The CWA requires that an Intended Use Plan (IUP) be developed, reviewed by the public and submitted as part of the state's grant application package to EPA. The purpose of the IUP is to describe how the state intends to use the funds in the CWSRF for the year and how those uses support the objectives of the CWA in the protection of public health and the environment. The following information is included in the IUP:

- A list of the projects expected to receive funding in the first year after the grant is awarded and a priority list of eligible projects for funding in future years. The lists must include a description of the project, priority assigned and the expected terms of financial assistance.

- The priority ranking structure (Priority System) must be primarily based upon water quality criteria and demonstrated environmental effects, and addresses the population served by each project.

The criteria and methods established for the distribution of the funds.

- A description of the financial status of the state loan fund and the short and long-term goals of the state loan fund. The current five-year (1998-2002) priority list integrates NPS projects into the ranking system. There are nine categories of projects with category one receiving highest priority for funding. Category three projects are those involving improvements to address NPS pollution where waterbodies are cited on the 303(d) list. Category six projects are those involving improvements to address NPS pollution where waterbodies are not cited on the 303(d) list.

ii. Strategy for Attracting Loans for NPS Projects

The state is making strong efforts to encourage and attract NPS projects for SRF loans. The BCB has made lending policy changes that significantly lower the loan interest rate for financing NPS projects under the CWSRF. The Board created a special new NPS interest rate category pegged at 150 basis points (1.50 percent) below the standard interest rate. Given the already low standard rate, the result is a two percent CWSRF loan interest rate for NPS projects for FY 1999. The incentive rate applies to the first $2 million of eligible costs in one or more such projects collectively for a single applicant. Also, SCDHEC is targeting counties and municipalities for outreach efforts to attract NPS projects for SRF loans.

iii. Examples of NPS projects Eligible for CWSRF Loans

In South Carolina, only units of government are currently eligible for SRF loans. This makes municipalities, counties, special purpose districts, and Soil and Water Conservation Districts legally able to accept CWSRF loans for NPS activities. Some examples of projects that these entities might implement with loans include:

- Construction and maintenance of stormwater management facilities including sediment control and stormwater control structures and constructed wetlands
- Establishment of a stormwater utility
- Purchase of land for wetlands preservation, buffers, riparian zones, etc.
- Rehabilitation and maintenance of unpaved roads, e.g., purchase and use of hydroseeder and other equipment
- Rehabilitation of streambanks, lakeshores, or riparian corridors
- Groundwater protection activities such as implementation of source water protection assessments
- Design, upgrade, monitoring, or closeout of landfills
- Removal and remediation of leaking underground storage tanks.
- Construction or rehabilitation to mitigate failing onsite wastewater systems
- Remediation of abandoned, contaminated industrial or commercial sites (Brownfields) Collection systems that would eliminate failing onsite wastewater disposal systems
- Installation of BMPs for agricultural activities including agricultural animal facilities

Best management practices, also known as Best management practices are defined as economically achievable measures to control the addition of pollutants from NPS activities, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. South Carolina will employ appropriate BMPs for NPS projects using SRF loan funds drawn from ***Guidelines Specifying Management Measures for Coastal NPS Waters*** (EPA, 1993***), Farming For Clean Water in South Carolina, A Handbook of Conservation Practices*** (SCDNR, 1997***)*** and the current version of the ***Field Office Technical Guide*** of the USDA Natural Resources Conservation Service. Other applicable sources will be applied as they are available. In addition, new and innovative technologies will be applied when it is agreed that they are effective in reducing NPS pollution. Although some generic practices would be applicable to many farms, most sites must be evaluated on a case-by-case basis by the appropriate agency or agencies.

f. Source Water Protection

The Source Water Protection (SWP) Program is a community-based, proactive approach to protecting public drinking water supply sources from contamination. An adequate protection plan includes five major components: 1) formation of a community planning team, 2) delineation of a protection area surrounding the public water supply, 3) identification of potential contaminant sources in the protection area, 4) determination of the susceptibility of public water sources to such contaminants, and 5) creation of a plan for current and future management of the protection area.

States are required to develop Source Water Assessment Programs (SWAP) before implementation activities occur. The state, or the state's delegated entity, will use the SWAP to assess local drinking water sources so that the local citizen, the community, and the public water system will have enough information to take action to prevent contamination of the drinking water source. The SWAP provisions of the SDWA require states regulating public water suppliers to assess all groundwater and surface water drinking water sources and identify activities in the source water protection area that could potentially degrade the water quality. To meet the requirements, each state must accomplish the following: 1) delineation of source water protection area, 2) contaminant inventory, 3) susceptibility analysis, 4) public access, 5) and public participation. SCDHEC is conducting the SWAP in South Carolina. It is expected to be complete by May, 2003. A total of 84 surface water intakes for 70 public water systems and 2048 wells for 1420 publicly owned water systems will be assessed by that time. Subsequently these communities should begin implementing Source Water Protection Programs at the local level. Section 319 funding may be made available for eligible activities such as implementation of BMPs at contaminant sources, and local source water protection education/information programs.

Home*A*Syst, a South Carolina NPS program and manual aimed at educating homeowners about NPS prevention around the home**,** and described previously in this document, will be updated to include chapters on drinking water protection. The Source Water Protection Program will contribute technical support to this effort so that the document accurately describes drinking water regulations and priorities for source water protection.

g. Geographic Information Systems and Mapping

i. Description

Geographic Information Systems (GIS) are used to create understandable digital maps of a geographic area. The maps can contain any number of information bits about the areas, arranged in digital layers. Each point on the map can be seen in terms of components such as land use, soil type, population densities, etc. GIS products are useful to NPS assessment and implementation and many Section 319 funded projects contain a GIS creation component.

A tool related to GIS is the global positioning system, or GPS. It has enhanced the use of GIS because it allows pinpoint accuracy in digital mapping. GPS is a satellite-based system that allows the user to determine this three-dimensional position, time, and velocity anywhere on earth. Using a hand-held device, the user determines his position on earth in relation to an orbiting satellite, which acts as an exact reference point. Using a GPS, locations of sites such as agricultural animal facilities, may be entered into a GIS. If many such sites are entered, the GIS could produce a map or map layer of confined animal sites in a geographic area.

ii. SCDHEC GIS Program

The Information Services Section of the Bureau of Water has professional GIS staff and a full range of equipment that provides a full range of GIS services. The GIS staff has developed and maintains and updates an environmental GIS database for the state of South Carolina. They also train other SCDHEC staff in the use of GIS.

The Section has outlined reasonable goals to be achieved within the five year period between January 1, 1999 and December 31, 2003. Accomplishment of these goals lead to perpetuation of a strong GIS program during this time frame. General goals include the acquisition of newly created geospatial data, the evaluation of currently available data, the creation of many standard operating procedures, as well as the development of a strong metadata program. Many of the goals are necessary due to the increased development of geospatially-referenced data within the work environment as a result of the decrease in cost and increase in accuracy of such technologies as Global Position Systems (GPS), satellite imagery and aerial photography, as well as data creation software systems such as CAD, desktop mapping and GIS. Some of the goals, such as providing a public presence and educational advancement of geographic information processing, will assist SCDHEC in maintaining strong support of the government and general populace within the state of South Carolina. Another goal is to provide internet access to South Carolina GIS coverages using Internet Map Server software. Initially, this information will be available to SCDHEC users only. Later on, the information will be made available to the public. Specific goals related to watershed and NPS program needs include:

- Incorporate 14-Digit Hydrologic Unit Boundaries into all Bureau of Water coverages
- Create agricultural animal facilities digital coverage including: swine, poultry and dairy

- Create land waste application sites (centroid only) associated with agricultural animal facilities
- Create 1:100K Water Classification coverage
- Create 1:100K navigable waters coverage
- Acquire 1999 National Aerial Photography (NAPP) for state
- Purchase City Green software (ARCVIEW module) - Train NPS and Watershed staff on usage
- Begin address matching of storm water permits
- Provide Internet access for environmental GIS coverages
- Update shellfish harvest classification coverage
- Update high and significant hazard dam coverage
- Coordinate with EQC Districts for continual updates to the NPDES building and endpoint coverage
- Update Water Quality Monitoring Site coverage, including random site selections
- Update map products for ***Watershed Water Quality Management Strategies***
- Update map products for 305(b) Report, 303(d) List and 208 Plan

Within the Division of Water Quality, Watershed Managers and Water Quality Certification, Standards, and Wetlands Section staff have Arcview software on desktop computers to allow convenient use of GIS applications. Watershed Managers use the tools to create and update GIS map products.

iii. Requirements for Projects with a GIS Component

The Environmental Protection Agency has established requirements and criteria for Section 319 funded projects that contain a GIS component. The basic premise of the requirements is to assure that GIS data developed as part of a project is easily transferable to other states and agencies. For equipment this means software should be ARC/INFO and GPS units should be of the differential type. There are also some GIS data requirements. All GIS hard-copy data must meet National Map Accuracy Standards, all digital-spatial data must meet federal Geographic Data Committee Metadata Standards, and all data input from maps should be retrieved from stable map forms, for example Mylar.

iv. HUC Mapping Project

The U.S. Geological Survey (USGS), in cooperation with the South Carolina Department of Health and Environmental Control, funded through a U.S. Environmental Protection Agency 319 Grant, and U.S. Department of Agriculture, Natural Resources Conservation Service, further subdivided hydrologic units in South Carolina using a 14-digit numbering system. The original 8-digit definition (2 digits each for the water resources region, subregion, accounting unit, and cataloging unit, respectively) has been enhanced with the addition of two 3-digit units (watershed and sub-watershed), 11- and 14-digits, respectively. This project followed guidelines published by the Natural Resources Conservation Service, National Instruction No. 170-304, *Guidelines for Mapping and Digitizing Hydrologic Units*.

The USGS checked and digitized the 1:24,000-scale drainage area maps, previously delineated by the U.S. Department of Agriculture, Natural Resources Conservation Service, for definition of 8, 11, and 14-digit hydrologic unit codes for South Carolina and for the parts of sub-watersheds that extend into North Carolina and Georgia. For this study, 1022 sub-watersheds were delineated. Of these, 1004 range in size from 3000 to 40,000 acres (4.69 to 62.5 square miles). Seventeen sub-watersheds are smaller than 3000 acres, and one sub-watershed, which is located on St. Helena Island, is larger than 40,000 acres. The 8, 11, and 14-digit hydrologic unit code boundaries are shown on a 1:100,000 scale

map. In addition, the hydrologic unit codes, boundary, and drainage-area data are stored in a Geographic Information System database, which is available on compact disc.

The hydrologic unit map and database provide a standardized base for use by water-resource managers and planners in locating, storing, retrieving, and exchanging hydrologic data. In addition, the map can be used for cataloging water data acquisition activities, geographically organizing hydrologic data, and planning and describing water use and related land use activities. It should prove very useful for NPS watershed projects.

h. Five-year Action Strategy for Support Programs

Table 4.1 Five-year Action Strategy for Support Programs

ACTION ITEM	LONG TERM GOAL REFERENCE	MECHANISM	RESPONSIBLE AGENCY(S)
1.Continue to implement the Section 319 grant program through effective management of the funds. Use annual and incremental funding between 1999 and 2003.	# 4, 5, 6	Section 319 funding	SCDHEC NPS staff
2. Develop and implement an educational strategy aimed at agricultural NPS impacts and the farming community between 1999 and 2003.	#6	Section 319, state funding	SCDHEC, SCDNR, Clemson Extension, etc.
3.Expand the Champions of the Environment Program so that it reaches more school children by running promotional messages all through the school year. Accomplish by 2001	# 6, 8	Section 319 funding and state resources	SCDHEC NPS Education staff, along with Champions partners
4. Produce "NPS Information Exchange" conferences on alternating years. Next one scheduled for 2001.	# 6, 8	Human resources required for planning and production	SCDHEC NPS staff
7. Explore the possibility of making SRF loans to the private sector	# 15	Overcome current restriction on the use of SRF recipients	SCDHEC, SC Budget and Control Board
6. Actively seek NPS projects for SRF loans and track progress annually.	# 9, 15	Implement SRF strategy for incorporating NPS projects	SCDHEC SRF staff, SCDHEC NPS staff
5. Plan and implement 12 assessments (10 macroinvertebrate and 2 water quality) on 303(d) listed waterbodies to quantify NPS impacts annually - 1999-2003	#1	Planned activities by monitoring staff	SCDHEC BOW

CHAPTER 5
NPS ENFORCEABLE MECHANISMS AND POLICIES

a. Description

An enforceable mechanism consists of: a standard applicable to an identified entity or entities; a sanction such as a civil, criminal, or administrative penalty, loss of a license, and performance of required remedial action (but not mere loss of an incentive); and a process, either explicit or implied, for applying the standard and imposing the sanction. For example, the standard may be a provision that "no person shall discharge a pollutant so as to cause or contribute to a violation of water quality standards," while the sanction and process may include administrative or civil penalties, cessation of the discharge, abatement, cost recovery, criminal fines and jail terms, or other remedies.

An enforceable mechanism is not limited to "regulatory" or permit-based regimes such as to the NPDES program. Indeed, mere liability for a clearly defined action is sufficient. Thus, the availability of injunctive relief and damages, or provisions of summary abatement and cost recovery, or the power to issue binding cease-and-desist orders, qualify as enforceable mechanisms. South Carolina employs a range of enforceable mechanisms covering several categories of NPS pollution.

South Carolina's efforts to regulate NPS pollution utilize legal authorities based on both federal and state law. The SCDHEC Office of Environmental Quality Control (EQC) derives its federal authority to implement a program to control NPS pollution from federal statute. SCDHEC is designated as the lead agency in South Carolina for purposes of PL 92-500, the Clean Water Act (CWA), and all of its provisions. Federal statutory authority for NPS water quality regulatory programs is provided by the 1987 amendments to the CWA through Sections 319, 401, 402, etc.

NPS compliance and enforcement program elements are critical components of South Carolina's total NPS management program towards achieving success in reducing NPS pollutant discharges to surface waters and groundwaters. Both voluntary and regulatory efforts are needed to accomplish these objectives. The state's NPS regulatory programs are water quality-based and require that the regulated sector comply with state water quality standards.

b. SC State Law

At the state level, authority to enforce NPS pollution provisions is found in the Pollution Control Act (PCA), SC Code Ann. 48-1-10 *et.seq*. (1987 & Supp.1998), and the myriad regulations promulgated thereunder. Within the state's coastal zone, the South Carolina Coastal Zone Management Act (CZMA) of 1977, codified as Tidelands and Wetlands, SC Code Ann. 48-39-10 *et.seq*. (Supp. 1998), also applies. Both of these laws are administered by SCDHEC. The PCA provides SCDHEC with broad authority to abate pollution from all sources. Section 48-1-90 provides "It shall be unlawful for any person, directly or indirectly, to throw, drain, run, allow to seep or otherwise discharge into the environment of the state, organic or inorganic matter, including sewage, industrial wastes and other wastes, except as in compliance with a permit issued by the Department." SCDHEC may issue administrative orders and institute legal proceedings, including proceedings for injunctive relief, to enforce this prohibition. The remedy requested in a legal action to enjoin such violations would include incorporation of any appropriate NPS management measures as necessary, and would seek restoration of the environment where appropriate. Furthermore, any person violating this prohibition is subject to civil and/or criminal penalties.

In addition to the general statutory authority provided under the PCA, SCDHEC has regulations to cover many potential sources of NPS pollution. Permits issued under the regulations may contain requirements for management measures as necessary. The Department is empowered to enforce permit conditions and compel compliance with the provisions of the PCA without first showing a violation of water quality standards. Further, if the controls available at present are not sufficient to address NPS pollution, the Department has ample legal authority under the PCA to craft additional regulations as necessary to authorize issuance of permits that incorporate appropriate management measures.

The SCDHEC Staff Attorney has issued a legal opinion that SCDHEC, through the PCA and the CZMA, has broad authority to control and abate all NPS pollution in the state. Used in conjunction with permitting regulations, the PCA and CZMA provide ample authority for abating NPS pollution. While the opinion applies specifically to the requirements of Section 6217 of the Coastal Zone Act Re-authorization Amendments (CZARA), it addresses abatement of NPS pollution in general. The full text of the opinion is found in Appendix 3.

c. Regulations for NPS Pollution Activities

In addition to statutory authority, the state has many regulations that relate to abatement of NPS pollution. Among the regulations that SCDHEC implements are regulations for the permitting and control of agricultural animal facilities (R.61-43), stormwater management and sediment control (R. 72-100 through 445), NPDES stormwater discharges (R. 61-9.122.26 and 122.28), onsite disposal systems (R.61-56, R.61-57), solid waste disposal activities (R. 61-107), mining operations (R.89-10 *et.seq*.), permits for construction in navigable waters (R.19-450), and others. Other state agencies such as the SC Department of Transportation, SC Department of Natural Resources, Clemson University, etc. also have applicable NPS-related regulations. These regulations and others are described in Chapter 7, under the NPS categorical sections.

d. NPDES Stormwater Permits

National Pollutant Discharge Elimination System (NPDES) stormwater permits are designed to reduce polluted runoff from municipal separate storm sewer systems (MS4s), and from construction sites. Although federal permits, in South Carolina they are issued, administered and enforced by the SCDHEC. Currently, only urbanized areas with populations greater than 100,000 and construction sites that disturb five acres or more are covered. Within two years, however, the Environmental Protection Agency has proposed to expand permit coverage to include urban areas with populations greater than 50,000 and construction sites one acre or more in size. These are “general permits”. That is, the provisions do not vary from permit holder to permit holder; the language remains the same.

MS4 NPDES permits require applicable urbanized areas to develop and implement a stormwater management program. Components of the plan include illicit discharge detection and elimination, construction site runoff, post construction stormwater management, pollution prevention and good housekeeping, monitoring, and public education and outreach. Currently, two urbanized area MS4 permits in South Carolina have been drafted and are under review by the permittees: Richland County and Greenville County. These two permits will be issued prior to October 1, 1999. When phase two of the program becomes effective, permits for approximately 50 more urbanized areas in the state will be issued.

NPDES general permits for construction sites are issued in conjunction with the SC Stormwater Management and Sediment Control Act. All construction site activities involving clearing, grading, and

excavating are covered. To receive a permit, an applicant must submit for approval a stormwater management plan. DHEC conducts periodic site inspections to assure compliance with the plan. To aid in implementation of the permit, a *SC Stormwater Management and Sediment Control Handbook* is available from SCDHEC. A number of best management practices for sediment and stormwater control are described in the appendix of the Handbook.

Dischargers of stormwater in South Carolina associated with industrial activity are required to seek coverage under a promulgated stormwater general permit. SCDHEC Bureau of Water issues and administers these permits. Stormwater discharge associated with industrial activity includes the discharge from any conveyance which is used for collecting and conveying stormwater and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial site. The categories of facilities covered under the permit include active or inactive mining operations; hazardous waste treatment, storage, or disposal sites; landfills, land application sites, and open dumps that receive industrial waste; facilities involved in recycling of industrial materials; transportation facilities; treatment works treating sewage; and construction sites including clearing, grading, and excavation activities. To satisfy permit requirements, the operator must provide SCDHEC with a site map showing topography of the facility site; an estimate of the impervious surfaces at the site; a certification that all outfalls that should contain stormwater discharges associated with industrial activity have been evaluated for the presence of non-stormwater discharges which are not covered by an NPDES permit; information regarding significant spills or leaks of toxic pollutants at the facility that have occurred three years prior to permit issuance; quantitative data based on samples collected during stormwater events; and proposed measures (including BMPs) to control pollutants in stormwater discharges during construction and after construction operations have been completed.

e. State Certifications

i. Water Quality Certification

Section 401 of the Clean Water Act provides that any applicant for a federal license or permit which results in discharge to navigable waters, shall provide the licensing or permitting agency a state certification that the discharge will comply with applicable sections of the law. In South Carolina, SCDHEC must certify that the discharge will comply with state water quality standards. SCDHEC may require that appropriate BMPs be implemented in order to meet these standards. Examples of construction activities needing Section 401 certification include docks, bridges, and dams. The certification also applies to certain activities that may adversely affect wetlands. A certification is denied if the activity will have permanent adverse effects on existing or designated uses. Most certifications are issued with conditions that are enforceable by the permitting or licensing of the activity.

ii. Coastal Zone Certification

Before any state or federal permit is issued for a development project in the state's coastal zone, SCDHEC OCRM must certify that the project is consistent with state coastal management policies. This process is called Coastal Zone Consistency Certification and is authorized by state law (State Coastal Management Act and the Coastal Management Program Document), and federal law (Federal Coastal Zone Management Act and Federal Regulations 15 CFR 930). A Coastal Zone Consistency Certification is required of any project taking place in the eight coastal counties (Horry, Georgetown, Berkeley, Charleston, Dorchester, Colleton, Beaufort, and Jasper) which requires any state or federal permit. No additional application is required of projects requiring certification; the consistency review process takes

place automatically upon application for a state or federal permit through an internal notification process. The process also provides for public notice and the decision can be appealed.

f. Compliance/Enforcement Activities

i. SCDHEC Compliance and Enforcement

Section 48-1-90 of the 1987 Pollution Control Act authorizes DHEC to implement corrective action against parties responsible for NPS-related water quality violations. Responsive action to NPS incidents minimizes further degradation of surface waters. SCDHEC has 12 Environmental Quality Control (EQC) District Offices, each with staff assigned to investigating and resolving NPS incidents. Each District has at least one experienced staff member who can properly handle acute NPS problems as they occur. District personnel assess NPS incidents and investigate NPS complaints as received and, (if necessary) will involve relevant Central Office personnel. More than 500 acute NPS complaints are received by the Districts each year. (District staff responded to 1605 NPS related complaints between January 1, 1996 and December 31, 1998.) The agency is typically notified about acute NPS problems through citizen complaints, while chronic NPS problems are often identified through the state's monitoring and watershed programs and referred by monitoring staff. Attempts are made to resolve problems by working with land owners or land users to either stop the pollution causing activity or apply proper BMPs. If voluntary mitigation fails, District personnel will refer the site to the Bureau of Water's Enforcement Division for mandatory corrective action.

Land disturbing activities resulting in soil erosion (and subsequent sedimentation and destruction of aquatic habitat) do result in enforcement proceedings. Most often, these activities are the result of non-compliance with state agricultural or stormwater permits. Unpermitted activities (such as silviculture) that impact water quality standards or aquatic life habitat are violations of the SC Pollution Control Act and also subject to compulsory mitigation and civil penalties. The Enforcement Division expects to follow-up on approximately 18 sediment, stormwater, or other nonpoint source related referrals annually. Enforcement proceedings typically include conferences, negotiations, and the issuance of a Consent Order signed by both the Bureau and the offending parties. Consent orders usually consist of stipulations agreeing to the incident, resultant damage, necessary corrective action, and a civil penalty. Refusal by a violator to sign a Consent Order results in the Bureau issuing a non-negotiable Administrative Order mandating mitigation and penalties. Administrative Orders may be appealed through the state's legal system.

The state has a variety of agricultural animal facilities with varying permit compliance histories. Existing facilities with permits are inspected to determine effectiveness of in-place Waste Management Plans. Unpermitted facilities are continually identified and will be inspected and required to prepare Waste Management Plans. Compliance monitoring (inspection) is performed in coordination with SCDHEC's 12 Environmental Quality Control district offices. On average, each district performs 100 Agricultural Animal Facility inspections annually, for a total of 1200 statewide.

In keeping with the Department's Watershed Water Quality Management Strategy (WWQMS), inspection activities follow the sequence for resource concentration. See Table 3.4. Further, facility location is correlated with 303(d) listed waterbodies with fecal coliform violations, and priority is given to assuring compliance of those facilities.

The above activities are implemented on a statewide basis. To accomplish the goals of the activities, specific, expeditious milestones will be accomplished.

Milestone	Complete
Respond to and resolve about 800 NPS related complaints statewide	1999, 2000, 2001, 2002, 2003
Follow up on 6 agricultural animal facility complaint referrals	1999, 2000, 2001, 2002, 2003
Follow up on 12 sediment or stormwater related complaint referrals	1999, 2000, 2001, 2002, 2003
Annually inspect 1200 animal feeding facilities for compliance with Waste Management Plans	1999, 2000, 2001, 2002, 2003

ii. SC Forestry Commission BMP Compliance

The South Carolina Forestry Commission (SCFC) implements a statewide, coordinated Best management practices (BMP) Compliance Program for forestry related activities. The program is implemented by authority of a Memorandum of Understanding between the SCFC and SCDHEC dated July 1, 1997. A copy of the MOU is included as Appendix 4. The BMP program focuses on a proactive approach to preventing NPS pollution through the offer of courtesy BMP exams by specially trained Forestry BMP Specialists. Forestry BMP Specialists work out of each of the SCFC's three regions. The courtesy exams provide forest landowners, foresters, and forestry operators with site-specific BMP information that can be included in timber sale contracts and implemented as forestry operations progress. Courtesy BMP exams are completed on approximately 300 forestry operations each year, and an additional 200 sites are randomly chosen for inclusion in annual BMP implementation monitoring.

High priority watersheds are surveyed from the air on a regular basis to locate active forestry operations. Sites are also located through voluntary notifications and complaint calls. Courtesy BMP exams are offered to the landowners after they are identified. Recommendations are made to the forestry operators concerning appropriate BMPs including streamside management zones, road construction, stream crossing design and location, and site preparation techniques. After the forestry operation is completed, a final onsite inspection is completed to determine if the appropriate BMPs were utilized. BMP compliance is significantly higher on sites where a courtesy BMP exam is completed (96% compliance). Where damage has already occurred, recommendations for mitigating the damage are made. A monthly summary report of completed courtesy BMP exams is provided to SCDHEC and the forest industry, indicating which forestry operators failed to implement the appropriate BMPs, resulting in a water quality impact. Failure to comply with BMPs may negatively influence a company’s decision to purchase forest products from the forestry operator. Further, SCDHEC may commence enforcement action based on the referral.

The Bureau of Water Enforcement division usually becomes involved in silviculture activities through two distinct pathways. Complaints registered by citizens are investigated within 48 hours. A site visit is made as a result. District personnel usually initiate contact with both the complainant and potentially offending party to determine the nature of the activity and if any environmental impact has occurred. If a forestry operation is suspected as the cause of the environmental impact, the SC Forestry Commission, through the Memorandum of Agreement with SCDHEC, is asked to conduct a site visit to

determine if BMPs were properly implemented. If there is no water quality impact, the Bureau has no further interest in this matter beyond reporting findings to the complainant. If there is a potential water quality impact, the primary concern is to limit the scope of the offsite ecological damage. In an attempt to mitigate the situation, the Bureau will work with the SC Forestry Commission, the logger and/or landowner, or their designated representatives (e.g. consulting foresters). Cases of severe impact or recalcitrance will immediately result in a referral to the Bureau's Water Enforcement Division.

If a referral from SCFC is acted upon by Enforcement, the Pollution Control Act applies. As of January 1, 1999, two silviculture cases have been settled by the Bureau's Water Enforcement Division, and two were pending. Settlement requirements for such cases include civil penalties paid by the responsible party, mitigation and restoration actions performed to the satisfaction of the SC Forestry Commission, and enhanced education requirements for the offenders.

This program is publicized through local media throughout the state. Forestry BMP Specialists conduct BMP training. Over 1500 landowners, foresters, loggers, and forestry operators have attended the Timber Operating Professional (TOP Logger) course since it was first offered in 1995. Short courses for site preparation and forest road construction are conducted periodically. BMP educational presentations are given monthly to forest landowner associations, forestry clubs, civic groups, environmental groups, and other interested parties.

Evidence shows that BMP compliance is significantly higher on sites where the landowner's compliance with BMPs is required in timber sale contracts. Timber harvesting BMPs have been evaluated for compliance on a statewide basis in comprehensive surveys four different times since 1989 when the program began. Compliance with harvesting BMPs was 84.5 percent in 1991, 84.7 percent in 1993, 89.5 percent in 1994, and 91.5 percent in 1997. Compliance with site preparation BMPs was 86.4 percent in 1996. A re-evaluation of site preparation BMP compliance is currently being conducted by SCFC.

g. Federal Consistency

In South Carolina, slightly more than nine percent of the land surface is owned by the federal government or used for federal activities. Federal land holdings include government reservations, military reservations, national forest, national military parks, national monuments, national scenic rivers, and national wildlife refuges. Activities on these lands could result in significant NPS impacts. Therefore, as part of the NPS Management Program, the state has established a system to assure consistency of activities and/or programs on federal land with the NPS Program. The NPS Program has established and currently maintains excellent relations with federal agencies in the state. In South Carolina, federal consistency is dealt with in several ways. Input into some federal agencies and programs, for example the Federal Energy Regulatory Commission (FERC) dam relicensing, is provided through Section 401 Certification review.

Pursuant to the federal consistency provisions of Section 319(b)(2)(F) of the Clean Water Act, the South Carolina NPS Management Program developed a list of the federal assistance programs and development projects which it wished to review for consistency with the State's NPS Management Program. These include:

- US Coast Guard- Location, design, construction, or enlargement of stations, bases, and lighthouses

- US Fish and Wildlife Service- Management of National Wildlife Refuges

- Department of Defense- Natural resource management plans and projects, facilities development plans and projects, projects to reduce specific NPS problems, and projects under the Defense Restoration Program

- Federal Highway Administration- Transportation Act for the 21st Century (TEA 21)

- Natural Resources Conservation Service- Environmental Quality Incentive Program, Conservation Reserve Program, Conservation Reserve Enhancement Program, Wetlands Reserve Program

Reviews are conducted in accordance with the state's Single Point of Contact (SPOC) established by Executive Order 12372. Executive Order 12372 "Intergovernmental Review of Federal Programs" structures the federal government's system of consultation with state and local governments on its decision involving grants, other forms of financial assistance and direct development. The SPOC sends notification of all federal applications and projects for the above named agencies and programs to the NPS Coordinator so that appropriate coordination and review can take place.

Also, program managers for nine military bases and one federal facility (Department of Defense) have been notified in writing of potential NPS impacts from activities on the bases and asked to inform the SCDHEC NPS Coordinator of such activities. For example, if a military base has land in timber and this timber is harvested, the NPS Program would like the opportunity to review the harvesting plan to assure that state BMPs are complied with. Compliance with this request is in process. Further, a Federal Facilities Liaison with SCDHEC provides coordination between federal facilities and the state.

An example of good communication and cooperation between the state and federal government in South Carolina is an initiative by the Fort Jackson Military Reservation near Columbia. This large Army basic training installation suffered severe soil erosion on certain parts of the property such as unpaved roads, grenade practice areas, heavy traffic areas such as rifle ranges, and borrow pits. The erosion was causing water quality degradation to streams and lakes on the base which is part of the Gills Creek watershed. This watershed was the subject of a comprehensive project funded under Section 319. SCDHEC NPS staff worked with Fort Jackson personnel to identify water quality impacts and sources of erosion. Also, SCDHEC provided letters of support to Fort Jackson to aid in securing federal Land Rehabilitation and Maintenance (LRAM) program funds for repair and maintenance of eroding land on the base. Best management practices that have been installed on Fort property as a result of this initiative include 23 sediment basins, 2.5 miles of diversions, 3000 linear feet of broad-based dips on dirt roads, 4 miles of grassed waterways, and placement of 28,000 square yards of geotextile erosion control blanket. To date, 57 sites have been remediated and 167 acres established in permanent vegetation. These BMPs have undoubtedly improved the water quality of streams and lakes in the portion of the Gills Creek system which lies within the Fort boundary, assisting in the success of the comprehensive Gills Creek Watershed Project.

Federal consistency with US Department of Agriculture (USDA) programs including those of Natural Resources Conservation Service, Farm Service Agency, and US Forest Service, are dealt with through State NPS Management Program staff membership on the NRCS State Technical Committee which meets monthly. Input into such NRCS initiatives as Environmental Quality Incentive Program (EQIP), Conservation Reserve Program (CRP), and Forestry Incentive program (FIP) is provided through

membership on this Committee. A more detailed description about this committee is provided in Chapter 6, Program Integration, Consensus Building, and Partnering.

SCDHEC OCRM is responsible for concurring with or objecting to federal activities in the Coastal Zone. These activities include any functions performed by or on behalf of a federal agency, federal licenses, Outer Continental Shelf plans, and federal assistance to state and local government agencies.

This process, called Coastal Zone Consistency Certification, is authorized by the state and federal Coastal Zone Management Acts, and federal regulations found in 15 CFR 930. No additional application is required of projects requiring certification of state or federal permits, as the consistency review process takes place automatically upon application through an internal notification process. For federal activities, the review takes place upon SCDHEC OCRM's receipt of a notice by the federal agency. The process also provides for public notices, and the decisions can be appealed.

These federal consistency activities provide an opportunity for the State NPS Management Program to engage federal agencies in state efforts to improve implementation of their NPS management programs, and hence, to more effectively protect water quality. They will be used effectively to promote communication and cooperation between state and federal agencies for achievement of shared water quality goals. If conflict between federal and state programs and activities arises, the state will seek conflict resolution through the EPA Region IV Office.

CHAPTER 6
PROGRAM INTEGRATION, CONSENSUS BUILDING, AND PARTNERING

a. Description

The State NPS Management Program is dependent upon the cooperation of all levels of government, the private sector stakeholders, and especially the citizens of the state in order to realize positive results. Many organizations have expertise that can be beneficial to the NPS pollution management program. For example, trade and environmental organizations have program delivery mechanisms that reach persons capable of implementing NPS controls, e.g., farmers, contractors, mine operators, and homeowners. These organizations can also provide feedback to state and federal agencies on the feasibility of proposed projects and whether certain strategies are working. For those reasons, South Carolina's program relies on collaboration and partnerships in implementing the Program.

SCDHEC collaborates with a number of other agencies and organizations involved in resource management in NPS Management Program development and implementation through formal and informal relationships. These partners include federal agencies, other state agencies, local governments, commodity and industry groups, watershed groups, homeowner associations, etc. The state anticipates working closely with stakeholders throughout the foreseeable future for program implementation.

b. NPS Task Force

The State NPS Task Force was formed originally in 1990. This stakeholder steering committee provides direction and input for the state's NPS Program, determines priority areas for Program implementation, is apprised of new or updated Section 319 guidance and other nonpoint source information, and provides comment on new program initiatives and outputs such as Management Plan Updates. Many of the represented agencies and organizations are also Section 319 grant recipients, or otherwise involved in implementing NPS projects. The Task Force may also provide feedback on Program effectiveness and make recommendations on improvements and mid-course corrections.

The Task Force meets on a regular basis, usually twice annually, and special meetings are called if necessary. Communication by other means, such as e-mail and letter, are also used.

In 1999, the Task Force was re-formed in order to better conform with the EPA guidelines for make-up of the state's Unified Watershed Assessment stakeholders group. Make-up of the committee includes two academic organizations, six federal agencies, eight state agencies, four citizen/ environmental organizations, and five private sector industry/commodity organizations. Member organizations on the

Task Force are:

SC State University
Sierra Club, SC Chapter
SC Wildlife Federation
SC Department of Agriculture
SC Forestry Commission
SC Forestry Association
SC Dept of Parks, Recreation, and Tourism
US Fish &Wildlife Service
US Geological Survey
USDA Natural Res.Cons.Service
SC Farm Bureau
SC Sea Grant consortium
Lake and Watershed Association of SC
Clemson University Extension Service
Water Environment Association of SC
US Army Corps of Engineers
US Forest Service
USDA Farm Service Agency
Grass Lands Coalition
SC Assoc.of Conservation Districts
SCDHEC Bureau of Water
SC Coastal Conservation League
SC Dept. Of Natural Resources
SC Dept. Of Transportation
SCDHEC Ocean & Coastal Resource Management

c. Participation in the Unified Watershed Assessment Process

Through the 1998 *Clean Water Action Plan*, EPA urged states to use a consolidated watershed process to determine NPS priority watersheds in which to focus resources for NPS abatement strategies. In South Carolina, the Unified Watershed Assessment (UWA) process utilized the expertise and capabilities of a diverse group of stakeholder organizations for collective decision-making. The UWA process is carried out by the State NPS Task Force. The process consisted of the following steps. SCDHEC and Natural Resources Conservation Service (NRCS) staff met to determine a preliminary list of high priority watersheds based on several factors including documented water quality problems, priority for EQIP funding, high probability for soil erosion, and other factors with the potential to affect water quality. Then, the 24 stakeholder agencies and organizations became involved in the selection process. The process included meeting with Task Force representatives (stakeholders) to discuss South Carolina's draft UWA, hosted by the NRCS and SCDHEC. As a result of stakeholder input, the priority watershed list was modified.

To allow an opportunity for public review, an announcement describing the draft South Carolina UWA process and priority watersheds was mailed to over 400 stakeholders throughout the state. This notice was also posted on the SCDHEC web site. The notice provided an opportunity for interested parties to obtain a more detailed packet of information on the draft UWA process and results and FY 1999-2000 priority watersheds, and included agency contacts from whom more information could be obtained. The UWA process will be carried out again in FY 2000 when new priority watersheds will be selected, and every two years thereafter.

In September 1998, SCDHEC developed and distributed guidance for use of the incremental FY 1999 319 funds allocated to states in support of Watershed Restoration Action Strategy (WRAS) implementation. This guidance and the projects funded through this program constitute critical first steps in the implementation of WRAS in the five priority watersheds. Nearly 500 guidance packets were distributed. Stakeholders who participated in UWA development also received a copy of the guidance, and several submitted proposals for funding. A total of 49 proposals were received; twelve were selected for funding by a 10-member, multi-agency review committee.

Continuous agency and public involvement in WRAS implementation is promoted and facilitated by SCDHEC's four watershed managers. These individuals, each responsible for two major river basins, serve as liaisons with stakeholders. They produce South Carolina's 303(d) list of NPS impaired waters, develop NPS TMDLs, and coordinate WRAS implementation.

d. NRCS State Technical Committee

The NRCS State Technical Committee is made up of representatives from 28 South Carolina agricultural and natural resource-related agencies. SCDHEC, as lead agency for the State's NPS Management Program and the water quality agency, is a member. The Committee normally meets monthly and provides direct input to NRCS programs such as the Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), Wetlands Reserve Program (WRP), and the Forestry Incentives Program (FIP). Each committee member has one vote on adoption of these programs. The SCDHEC member also serves on the sub-committee that selects South Carolina projects for funding under EQIP. EQIP provides cost share financial assistance and technical assistance to producers for implementation of agriculture- related BMPs. NRCS uses standardized criteria for ranking proposals, including water quality considerations. SCDHEC Watershed Managers also work with NRCS District Conservationists and county S&WCDs to prepare water quality focused EQIP proposals. SCDHEC's involvement in this Committee has provided the opportunity to try to direct these projects to waterbodies in need of water quality improvement.

EQIP projects are currently confined to areas within county borders or watersheds within a county. SCDHEC and NRCS are exploring ways to change EQIP rules so that EQIP projects can follow watershed boundaries and integrate with the state's Unified Watershed Assessment
Strategy.

e. Stakeholder Input for the Agricultural Animal Facility Permit Program

The SC Poultry Federation, the SC Pork Board, the SC Dairy Association, Ag First Lending, Pee Dee Farm Credit and Farm Bureau have all been very cooperative and willing to work with SCDHEC. Many of these groups were involved in assisting SCDHEC with the promulgation of the new state agricultural regulations that became effective in July of 1998. Representatives from Farm Bureau, Ag First and the SC Pork Board served on a regulation committee that was formed during the Department's development of the new "Standards for the Permitting of Agricultural Animal Facilities". The committee was presented with the challenge of reviewing and debating the proposed regulations developed by the Department. This committee gave the professionals and experts in the industry a chance to give their perspective for the feasibility of the proposed environmental standards. All of these groups supported the new regulations through the legislative process. The lending agencies have worked hard to ensure that farms have obtained all necessary state permits and are in good standing with the state prior to closing on farm loans. All of these groups have worked diligently to educate producers in the industry on these new standards. These groups have invited our agency representatives to be involved in their conferences, meetings and seminars. They have helped circulate information on these new regulations through their monthly newsletters and mail-outs to group members. Many group representatives have also been very helpful in serving as liaisons between the producers and the regulatory agency by encouraging voluntary compliance and cooperation.

The agricultural animal production industry has also assisted the Department in their mission of protecting public health and the environment. Many of the major players in the swine industry including Brown's of Carolina, Carroll's Foods, and Orangeburg Foods have been cooperative in the movement to adopt state agricultural regulations. The poultry industry has also been involved in this movement, including many of the contract companies such as Perdue Farms, Prestage Farms, Amick Farms, Columbia Farms, and Gold Kist. All of these integrators, or contract farm companies, have been very cooperative in helping the Department to fulfill its goals. Many of the integrators have sent representatives to regulation seminars put on by the Department. Packets of regulatory information have been voluntarily distributed to the contract farmers by these integrators. They have all played a key role in helping the Department educate the farmers or animal producers on their responsibility to protect the environment. Many integrators are now requiring their producers to obtain all necessary state permits prior to initiating a contract with that company. Some of these integrators will not provide a contract farm with more animals if that particular farm currently has a

permit violation or is involved in an enforcement action with the state. In a time when the industry has moved towards contract farming, this cooperation with the integrators or companies involved has made it easier for the Department to ensure that farms are operating properly with a permit.

f. Interagency 404 Permit Review Committee

The SCDHEC Interagency 404 Permit Review Committee provides the opportunity for potential permit applicants to present project plans in their early stages. First organized by SCDHEC OCRM as a method for reviewing marina applications, the Interagency meeting is usually attended by staff from both state and federal resource agencies who would review any permit application. The monthly meetings deal with issues statewide and allow applicants to present plans to various reviewers who can then comment on any potential problems. Along with permit applicants, participants include representatives from SCDHEC, SC Department of Natural Resources, US Fish and Wildlife Service, US Army Corps of Engineers, US National Marine Fisheries Service, US Environmental Protection Agency, and US Dept. of Agriculture.

g. South Carolina Farm Bureau

The SCDHEC BOW will work with an agricultural industry organization, the South Carolina Farm Bureau, to explore ways to communicate the goals of the NPS Management Program to its membership, the agricultural community. The Farm Bureau has agreed to help convey this information through commodity meetings, Farm Bureau publications, and workshops. Staff from both agencies will work together to develop a strategy to achieve this goal.

h. Other Partnering Opportunities

Besides the State NPS Task Force, SCDHEC utilizes several stakeholder committees that help in implementation of the NPS Management Program. These include:

- Section 319 Proposal Review Committee
- Interagency 404 Permit Review Committee
- Statewide Riparian Forest Buffer Task Force

Besides the NRCS State Technical Committee, SCDHEC NPS Program staff serve on numerous NPS- related committees and provide input from that standpoint. These include:

- Bi-State Catawba River Task Force
- Grasslands Coalition
- South Carolina Catawba River Corridor Task force
- Edisto River Task Force
- Savannah River Watershed Project NPS Action Team and Policy Committee
- Interagency Shellfish Restoration Team
- Beaufort County Special Area Management Plan Technical Committee
- Lynches Scenic River Advisory Council
- NRCS Buffer Task Force
- Keowee Watershed Alliance
- SC Water Resources Center Advisory Board
- EPA Region IV Nutrient Criteria Development Team
- Lower Saluda Scenic River Advisory Committee
- State Wetlands Mitigation Banking Review Team

- Charleston Harbor Project Management Committee
- SC Coast *A*Syst Technical Advisory Committee
- Governor's Committee on Natural Resources

i. Public Input Into the NPS Program

NPS stakeholders and the public have opportunity to comment and provide input into this *NPS Management Program Update* document before it was finalized. Stakeholder input is provided through the State NPS Task Force review and comment. Comments from the public on the draft Update were solicited through the standard public notice and comment period.

Watershed Water Quality Management Strategy River Basin Plans are prepared by DHEC's Watershed Managers and are reviewed by a wide range of stakeholders. When complete, workshops are conducted within the Basin to explain the Plans and solicit public acceptance. Previous workshops have had considerable discussion about nonpoint source issues.

j. Five-year Strategy for Program Integration

Table 6.1 Five-year Action Strategy for Program Integration Activities

ACTION ITEM	*LONG TERM GOAL REFERENCE*	*MECHANISM*	*IMPLEMENTING AGENCY(S)*
To continue to utilize the expertise of the NPS Task Force membership to provide direction for the NPS Management program and to evaluate program effectiveness and recommend mid-course corrections.	# 8	Twice annual Task Force meetings and other communications with membership	Twenty five member organizations, SCDHEC
Provide the opportunity for the citizens of south Carolina to have input into the state's NPS Management Program	# 8	Solicit public comment on draft NPS documents through implementation of the public participation process. Publicize through press releases important events and outputs of the Program	SCDHEC BOW, SCDHEC OCRM
Work with the SC Farm Bureau to develop a strategy to jointly communicate NPS Mgt. Program goals to its membership - 1999-2003	# 8	Commodity committee meetings, workshops, Farm Bureau publications	SC Farm Bureau, SCDHEC, agricultural community

CHAPTER 7. CATEGORICAL NPS PROGRAMS

a. Agriculture

i. Categorical Description and Extent of Problem

This Section describes the programs and policies in South Carolina that address NPS pollution from agricultural activities. These programs implement management measures recommended by EPA for abating

the pollution in runoff from agricultural sources. Ongoing educational, technical assistance and regulatory programs constitute the statewide agricultural program. BMP implementation, special assessments, outreach efforts, and monitoring activities in targeted watersheds will be implemented according to the State's Watershed Water Quality Management Strategy. A five-year action plan describing near term goals and milestones for agriculture is also included at the end of the Section.

South Carolina implements the NPS management program for agriculture through regulatory programs administered by the South Carolina Department of Health and Environmental Control (SCDHEC) and Clemson University, and voluntary programs conducted by the South Carolina Department of Natural Resources (SCDNR)-Land Resources and Conservation Districts Division (LRCD), SCDHEC, Clemson University Cooperative Extension Service (CES), and the United States Department of Agriculture's Natural Resources Conservation Service (USDA-NRCS). Regulatory programs are used in conjunction with the State's Pollution Control Act (PCA) to protect water quality from agricultural sources of NPS runoff. South Carolina also has specific state laws and regulations governing animal waste, pesticides, and certain irrigation practices.

The Natural Resources Conservation Service (NRCS) estimates that the present rate of compliance with voluntary management measures on agricultural lands in the South Carolina is 50 to 60 percent. Through implementation of the state's NPS management program described herein, a goal 70 percent compliance is sought by 2003.

Agricultural activities in South Carolina are diverse. Production includes traditional row crop farming, fruits and vegetables, livestock, poultry, and horticultural crops. The following information is from ***South Carolina Agricultural Statistics*** **(USDA-NASS**). The number of farms in South Carolina as of 1997, was estimated at 21,500, down slightly from 22,000 farms in 1995. Total land in farms for 1995, was 15 million acres, down 100,000 acres from the previous year. In 1997, the percentage of land in farms for the state was 24 percent (***U.S. Bureau of the Census, Census of Agriculture, 1997***). Also in 1996, 1,641,000 acres of crops were harvested in South Carolina which resulted in $874 million in raw product sales.

Livestock production also has a large economic impact on the state. The total livestock and poultry inventory value for 1996 was $257 million. There were 500,000 cattle and calves on South Carolina farms in 1996, which was down 4 percent from 1995. The milk cow inventory at 26,500 in 1995 decreased slightly to 26,000 in 1996. Hogs and pigs on South Carolina farms as of December 1, 1996, totaled 300,000 head, down 4 percent from 1995. The inventory value was $267 million, a 7 percent decrease from 1995. South Carolina ranked twentieth in the nation in hog numbers, with North Carolina third, and Georgia fourteenth. Chickens in commercial and farm flocks in South Carolina, as of

December 1, 1996, totaled 5,940,000 birds. The inventory value was $17.2 million in 1996. Broiler production increased 15 percent from 1995. There were 786,300,000 pounds produced receiving an average of 39 cents per pound live weight equivalent (USDA-NASS, 1996).

Improperly managed agricultural activities, including both crop and animal production, have the ability to affect surface and groundwaters. NPS pollution originates from land use and production activities. EPA has identified six major categories of sources of agricultural NPS pollution. They are erosion from cropland, agricultural animal facilities, application of nutrients to cropland, application of pesticides to cropland, grazing management, and irrigation of cropland. The above categories of agricultural nonpoint pollution are found to some extent in South Carolina. South Carolina's NPS Management Program addresses all six categories.

In South Carolina, pesticides, fertilizers, animal waste, and sediment are potential sources of agricultural NPS pollution. The management of agricultural production activities effect the amount and severity of these adverse impacts. For example, application of herbicides for row crop production can pollute surface waters through runoff depending on the amount and timing of application. Therefore, management practice, type of production, and structural control practices used can effect agriculture's contribution to nonpoint pollution. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment, or through the management of water.

ii. Cooperating Agencies and Programs

The following discussion describes the major agencies and programs which address NPS pollution from agricultural sources. In addition to the efforts listed below, Section 319 grants fund a number of implementation projects and assessment efforts that are being or have been conducted throughout the state in high priority watersheds. These combined efforts will work to reach the implementation goals of the NPS Management Program in South Carolina.

The South Carolina Department of Health and Environmental Control
SCDHEC is the state's lead agency for water quality protection and is responsible for NPS pollution management under the federal Clean water Act (CWA) and the Coastal Zone Act Reauthorization Amendments (CZARA). This agency plans and coordinates NPS projects through Section 319 of the CWA, and implements the Coastal Nonpoint Pollution Control Program described in Section 6217 of the CZARA. The agency maintains regulatory general and specific authority over agricultural activities, develops and enforces water quality standards, implements water quality monitoring, and provides for interagency coordination with respect to the NPS management program. Specific regulatory programs for animal waste management are discussed in detail later in this Section.

Section 319 grant funds are used to implement NPS activities and projects both statewide and in priority watersheds. Cooperating agencies such as Soil and Water Conservation Districts, other state agencies Federal agencies universities, citizens groups, and other organizations receive a large portion of the grant funds each year to design and implement projects. Since the program began in 1990, 37 individual projects and activities relating to agriculture have been implemented by cooperating agencies using financial assistance through Section 319 funding. Of these projects, eleven, have been implemented in priority watersheds, as shown in the table below.

Table 7.1 Section 319 Funded Agricultural Projects Conducted in Priority Watersheds

PROJECT TITLE/LOCATION	***HUC (WATERSHED)***	***IMPLEMENTING AGENCY(s)***
Bush River/Camping Creek (Phase 1, Phase 2)	03050108-190	DNR, CES, NRCS, SWCD, SCFC, SCDHEC, SC Dept. Agriculture., producers
Long Cane Creek	03060103-150	DNR, NRCS, SCFC, SWCD, producers
Fork Creek	03040201-050	Clemson U., CES, producers
Oconee County Watershed	03060102-150,120,130	Clemson U, NRCS, DNR, SWCD, producers
Strategic Watershed Mgt. In Stevens Creek/Coneross Cr.	03060107-010 03060101-080	DNR, SWCD, NRCS, CES, RC&D, producers
Evaluation of Chemical Loadings &Transport & Selection of BMPs	03050110-050	USC, SCDHEC, producers
Poultry Waste Utilization	03050101-190,200 03050103-010,028,042,060	SWCD, NRCS, DNR, CES, producers
Crooked Creek Water Quality	03040201-072	NRCS, SWCD, DNR, producers
GIS Technology to Improve Watershed	03060101-100,70,40,50	Clemson U., SWCD, CES, local high school
Wilson Creek/Ninety Six Creek	03050109-140	SWCD, NRCS, CES, DNR, producers

United States Department of Agriculture

A major effort to implement agricultural BMPs is accomplished by the conservation planning work of the USDA, in particular the work of the Natural Resources Conservation Service (NRCS) and the Farm Service agency (FSA). Producers may develop a conservation plan voluntarily or as a requirement of a commodity or cost-share program or any other program tied to payments from any USDA agency. NRCS provides technical assistance in developing these plans and FSA provides funding. Since 1985, any producer that receives financial assistance from USDA must meet the conservation provisions of the 1985 Farm Bill. This bill requires that producers farm in an environmentally sensitive manner in order to receive funds from the USDA. In the past, conservation planning efforts have focused primarily on erosion control. However, USDA's new approach is that of a total resource management system. Noncompliance with an approved conservation plan under the Food Security Act, also know as the Farm Bill, may result in a loss of all USDA benefits.

NRCS assists animal producers in developing animal waste management plans required by SCDHEC for agricultural animal facilities. Additionally NRCS provides assistance to producers of non-confined animals which utilize grazing lands through the planning and application of grazing management plans. The purpose of these plans are to maintain or improve water quality and quantity while improving and maintaining a stable and desirable plant community and providing food; cover and shelter for animals of concern.

USDA offers cost share incentives to landowners to install conservation practices for agricultural NPS. The following provisions of the 1996 Farm Bill are available to farmers to address NPS concerns:

Conservation Reserve Program (CRP) The CRP is the largest conservation initiative undertaken by the USDA. The purpose of the program is to retire the most environmentally sensitive cropland from production. Only offers that provide the most environmental benefits for the least cost to the government are accepted into the program. Ten areas in South Carolina have been designated nationally as State Water Quality Priority Areas for CRP purposes. The designation gives producers in these areas priority consideration for the program, for improving water quality by reducing NPS pollution from cropland. The approved areas are: Santee River/Lake Marion (Clarendon County), Santee River (Williamsburg County), Chatooga/Chauga/Tugaloo Rivers (Anderson and Oconee Counties), Little Saluda/Clouds Creek (Saluda County), Thompson/Westfield Creeks (Chesterfield County), Fork Creek/South Fork Edisto (Edgefield County), Salkehatchie River (Colleton County), and West Orangeburg (Orangeburg County).

Producers with approved CRP contracts are paid annual rental payments for 10 to 15 years for converting the environmentally sensitive cropland to permanent covers. In addition, cost share assistance is available to the producers for the establishment of the permanent cover. As of March 5, 1999, South Carolina had 193,000 acres enrolled in CRP. Of that acreage, 13,000 acres have been devoted to filter strip and riparian buffers. Annually, producers are receiving over $7 million in CRP rental payments, and in 1998, producers received $500,000 in cost share assistance for the establishment of permanent cover.

Conservation Reserve Enhancement Program (CREP) CREP is a partnership between the USDA Secretary of Agriculture and the Governor of South Carolina and administered by the SC Department of Natural Resources and the USDA Farm Service Agency. It is targeted to areas in which row cropped acres are impairing water quality. Eligible acres offered in an approved program CREP area will be automatically approved. The sign up for CREP will be continuous with each state being limited to 100,000 acres. The program is similar in scope to the CRP except that it is implemented under priorities that each state sets. South Carolina's program is currently in the preliminary planning stages but will be developed to enhance water quality and wildlife habitat related to agricultural runoff. Implementation of the program is targeted for FY-2000-2001.

Environmental Quality Incentives Program (EQIP) The EQIP is a relatively new program that replaces the old Water Quality Incentives Program (WQIP) and broadens the scope of the Conservation Reserve Program. It is an incentive based program that works well to address NPS water pollution. The EQIP provides to producers technical assistance and cost share funds of up to 75 percent of the cost of water quality effective conservation practices, such as manure management systems, pest management, and erosion control. Under the rules of EQIP, states establish conservation priority areas where significant water, soil, and related natural resource problems suspected to be caused by NPS exist. This is done in cooperation with state and federal agencies and with the approval of the State Technical Committee. In South Carolina, watersheds with water quality problems are given highest priority when selecting watersheds for EQIP projects. SCDHEC NPS staff, along with staff from several other state and federal agencies, participate on the EQIP project selection committee. For fiscal year 1999, South Carolina's allocation for EQIP projects is $1,616,000, with 65 percent, or $1,051,000 allocated for priority watersheds, and 35 percent, or $565,000 allocated for statewide concerns. This is in addition to the FY-1998 allocation of $1,685,000 which was divided in the same way. A total of twelve EQIP projects are currently funded, as shown in Table 7.2. Each one addresses NPS water quality problems and provides cost share assistance for water quality related BMPs. An example is the Lake

Wallace/Crooked Creek project in Marlboro County. The total project request is for $500,000 over five years. EQIP funds are being used to install BMPs for animal waste (broiler litter stack house and proper waste utilization) as well as those for row crops and pasture land (conservation tillage, cover crops, field borders, and filter strips). To date, $229,000 in EQIP funds have been allocated with two years to go. The Crooked Creek watershed is also the location of a complementary Section 319 funded project that is providing $97,000 ($58,200 in federal and $38,800 in local match funds) for purchase, demonstration, and use by producers of conservation tillage equipment. The objective of the two projects is to enhance water quality in Crooked Creek and the downstream Lake Paul Wallace. Water quality monitoring in Crooked Creek will evaluate the effectiveness of the BMPs.

Table 7.2 South Carolina EQIP Projects

PRIORITY AREA/ PROJECT NAME	COUNTY(S)	ACRES	FY-99 FUNDING
L. Wallace/Crooked Cr.	Marlboro	98,000	$70,000
Ridge Sustainable Agriculture	Edgefield, Aiken, Lexington, Saluda	100,000	$90,000
Dillon Waste Management	Dillon	135,000	$100,000
Horry Wetland Protection	Horry	170,000	$110,000
Upper Black river	Sumter	215,000	$110,000
Upper Lake Marion	Clarendon	37,400	$79,000
Upper Salkehatchie	Barnwell	137,000	$88,000
Lower lake Marion	Clarendon	48,000	$79,000
Black Mingo	Williamsburg	47,300	$78,000
Little Saluda River	Saluda	40,788	$78,000
Central Kershaw	Kershaw	49,700	$79,000
Scope Ore Watershed	Lee	67,000	$78,000

Wetlands Reserve Program (WRP) This program provides incentive payments to landowners who take converted wetlands out of production and restore them to their natural state. The program has three options: permanent easements, 30-year easements, and 10-year agreements. If a landowner agrees to a permanent easement, USDA will pay 100 percent of the cost of restoration and 100 percent of the assessed value of the land. If the landowner agrees to a 30-year easement, USDA will pay up to 75 percent of these costs. Under the 10-year agreement option, USDA will pay up to 75 percent of the cost of restoration. In South Carolina, 8500 acres have been enrolled in the WRP program at a cost of $7 million. The state WRP allocation for FY-1999 is another $1 million. Staff from NRCS and the US Fish and Wildlife Service review proposals The goal of this program is no net loss of wetlands.

State Buffer Initiative Team The State Initiative Buffer Team, a Subcommittee of the NRCS State Technical Committee, was formed in July 1998 to evaluate conservation buffer practices being used in South Carolina to determine if these practices can be better used to benefit all resources. The team's specific objectives are: 1) to identify the types of buffer practices available in SC; 2) to evaluate the amount and location of buffers that have been installed in SC and view a representative sample to ascertain on-the-ground composition and structure; 3) to evaluate the NRCS specifications for each

buffer practice and, to the extent possible, modify specifications to ensure that practices benefit all resource concerns (i.e., soil, water, wildlife); 4) to coordinate interagency training on buffer practices; 5) to coordinate development of public outreach tools to encourage landowners to install conservation buffers; and 6) if needed, to develop and promote additional tools and/or incentives to encourage implementation of desired buffer practices. The team met several times in the summer and fall of 1998 and, thus far, has focused on the first three objectives.

South Carolina Department of Natural Resources and Conservation Districts

The South Carolina Department of Natural Resources (SCDNR), Land, Water and Conservation Division (LWCD), administers the South Carolina Soil and Water Conservation Districts Law and coordinates the activities of the 46 Soil and Water Conservation Districts (SWCD) whose boundaries are conterminous with county boundaries. The LWCD implements soil and water conservation programs in conjunction with SWCDs, local governments, USDA-NRCS and other entities through education, technical, and financial assistance.

The SWCDs address local erosion and sediment control, stormwater management and other natural resource issues; serve as a clearinghouse for natural resource information; and provide technical assistance and education; and conduct demonstrations on, conservation planning and implementation for farmers and other land users in the district. The district boards of commissioners provide local input into the conservation planning effort which is carried out in conjunction with the federal programs discussed later. The LWC has staff that assist SWCDs. SCDNR and the individual Districts are current and past cooperators in implementing Section 319 funded projects.

SCDNR LWCD provides technical assistance for planning and implementing conservation tillage and drip irrigation. State legislation provides state income tax credits for producers who purchase conservation tillage planters and drip irrigation systems, and who construct and restore impoundments for the purpose of erosion and sediment control. The LWCD developed technical criteria for the South Carolina Department of Revenue for implementation of this legislation. Applicants for the water impoundment tax credit must either obtain a construction permit (pursuant to the SC Dams and Reservoirs Safety Act) from SCDHEC or a certificate of exemption, which may be issued by either SCDHEC or the SWCD in which the impoundment is located.

Many SWCDs own conservation tillage and drip irrigation equipment and in turn rent to farmers. Forty-one conservation tillage drills, two conservation tillage planters, and ten pieces of drip irrigation installation equipment are available throughout the state. In addition, SWCDs own a variety of other conservation equipment for use by farmers. This equipment enhances the ability of SWCDs and LWC to demonstrate conservation technology.

The SC General Assembly has appropriated a $690,000 for the Natural Resource Enhancement Program, to be administered by SCDNR, LRCC. Local Soil and Water Conservation Districts may apply for $15,000 to enhance natural resources within a county. The funds could be used for BMP implementation. SCDNR is requesting that the appropriation be added permanently to the agency's budget.

The Farm and Forest Lands Protection Act was introduced in 1999. This bill would create county programs to allow counties to voluntarily create priority agriculture land areas (PALs) and purchase conservation easements within those areas to preserve farm and forest lands, scenic and cultural landscapes, and environmentally sensitive areas such as open spaces for wildlife habitat, and clean air and water. In addition, the state would establish protection of farm and forest lands as a state policy.

Clemson University and Cooperative Extension Service

Clemson University, the state's land grant institution, conducts several activities directly related to NPS pollution. The research program in the College of Agriculture, Forestry and Life Sciences develops new technology for environmentally sound agricultural production. Some examples are the Integrated Pest Management Program, the Profitable and Sustainable Agricultural Program, and the Sustainable Research and Education Program. These programs address NPS issues and complement the State NPS Management Program. An important output of these programs is the development of practices to enhance water quality and reduce production costs.

In consort with research programs at Clemson University is the Clemson University Cooperative Extension Service (CES). The link between the research programs and the CES is the system of field stations operated by SC Agricultural Experiment Station (SCAES). The SCAES is a counterpart to the Extension Service that relates to research and technology transfer functions. The CES provides technical assistance and serves as a vehicle for technology transfer through educational demonstrations and individual contact with farmers. In addition, a Coast-A-syst program is being developed to address NPS issues related to South Carolina's unique coastal ecosystems.

The CES has established committees to address water quality issues. The Clemson Extension Water Quality Program coordinates and facilitates water quality and watershed education projects statewide. By establishing core groups of professionals within the University, Clemson is able to direct extension and research efforts to areas affected by NPS problems. Educational information on sound environmental practices is then distributed through local CES offices, which coordinate with other local entities to target problem areas.

Clemson also plays a key role in a state initiative, the Certified Crop Adviser (CCA) Program. The CCA Program was developed by the American Society of Agronomy (ASA) in cooperation with agribusiness retail dealers, cooperatives and manufacturers, state and national trade associations, the USDA, and independent consultants. The CCA Program was initiated by industry working through the ASA and several other professional societies. The purpose of establishing the program was to certify the technical competency of individuals who provide advice to farmers on crop production including nutrient, soil and water, pest, and crop management. The certification process includes national and state examinations, educational accomplishments, and appropriate experience in four competency areas including soil fertility, soil and water management, pest management, and crop production.

The Clemson University Cooperative Extension Service trains all private pesticide applicators for licensing through its pesticide information program. This training includes instruction in Private Applicator responsibilities when using pesticides, especially with respect to the federal Insecticide, Fungicide and Rodenticide Act, the South Carolina Pesticide Act and the South Carolina Chemigation Act. Special instruction is given with respect to protection of ground and surface waters in this training.

The CES Pesticide Information Program also provides recertification training for private, commercial and noncommercial pesticide applicators. The CES is the primary trainer for private applicator recertification training. Instruction is given in water quality protection, chemigation safety, aquatic pest control safety, pesticide spill prevention and cleanup, proper disposal of empty pesticide containers, pesticide mix/load site safety, reducing pesticide runoff and leaching, proper application equipment calibration, pesticide label interpretation, proper pesticide storage, sensitive area awareness and related topics. Additionally, the pesticide information program provides general education in pesticide safe use.

Clemson University and the Cooperative Extension Service have a wide variety of programs for the agricultural community toward reducing water pollution from agricultural animal operations. In conjunction with SCDHEC, Clemson has developed a manure manager's training program which is voluntary for operators of all animal operations except large swine facilities (3,000 or more finishing hogs) for whom this is mandatory. This program was mandated by the SC Confined Swine Feeding Operations Act of 1996 for owner's of swine facilities. Clemson and SCDHEC encourage all owners of animal feeding operations regardless of size to obtain certification under this program.

CES encourages farmers to take advantage of a variety of voluntary programs offered by the private sector. For example, John Deere sponsors a program called Managing Non-point Source Pollution in Agriculture. State Home*A*Syst (Home Assessment System) and Farm*A*Syst (Farm Assessment System) are nationwide voluntary programs that have been tailored for South Carolina audiences. Poultry producers may get help from the Poultry Water Quality Consortium, while the Dairy Network Partnership offers assistance to dairy producers. The Clemson Manure Management Demonstration Project emphasizes record-keeping, milking center waste disposal and manure management.

The South Carolina Cooperative Extension System Plan of Work (POW) is a four-year plan of work document. The current POW runs through June 30, 2001. Included in the POW are educational programs that are conducted by CES specialists and county staff. These programs focus around five Public Service and Agriculture (PSA) goal areas. These include Agrisystems and Productivity, Community and Economic Development, Environmental Conservation, Food Nutrition and Safety, and Youth Development. The POW is also in alignment with the goals of 1993 Government Performance Results Act. Under each of these goals are initiatives. There are 16 initiatives in the current POW. Under each initiative there are projects which specify the problem situation, the objectives and goals and performance indicators. There are about 71 projects under the 16 initiatives and PSA goals. These projects are developed based on input from Extension Advisory Committees at the local level, other stakeholders, specialists and extension agents. The initiatives within the POW are described in detail on the Clemson Extension Web page: **http://virtual.clemson.edu/groups/ extension/employee/plan/plan.htm.**

Several of the POW initiatives specifically address topics relevant to NPS pollution and water quality. Initiative 401 - Reducing the Impact of Animal Agriculture on the Environment, will increase the adoption of practices that lessen nuisance and environmental impacts through the educational process. The topics addressed could include: control of odors and vectors, protection of water quality, nutrient management, siting of facilities, and alternative waste handling practices. Emphasis will be on concentrated animal production facilities. Initiative 403 - Natural Resources and the Environment will consider the vast resources of the state and develop projects that will promote sustainable use and management of the land and water through education. Environmental issues of land, wildlife and water will be considered. Projects within this initiative specifically address best management practices and water quality/NPS pollution education for homeowners, farmers and youth.

South Carolina State University

The 1890 Extension Program of the University serves as the informal outreach, education and information source for rural and urban limited resource customers to improve their level and quality of living and to help them achieve their goals through wise resource management. The Program provides useful and practical information to foster the improvement of agriculture, enhance management of forest resources, strengthen the family as individuals and as a unit, enhance rural and community development, and develop human resources. Extension work focuses on the following four areas: agriculture and natural resources, family development and resources management, economic development, and urban-

rural revitalization.

The Small Farmers Outreach, Training, and Technical Assistance Project (SFOTTAP**)** operates under the auspices of Cooperative Extension. This project assists small and limited resource farmers with specialized technical assistance to enhance their farm management skills. It is funded by USDA NRCS. SFOTTAP works with limited resource farmers to adopt sustainable agricultural practices. The goal of the project is to get farmers to adopt at least one sustainable agricultural practice so as to achieve the national goal of environmental protection.

The Solid Waste Management Recycling Project addresses serious solid waste problems involving all areas, rural and urban, for which all elements of society are responsible. The SC State University program involves all consumers on the Orangeburg, SC campus -- students, administrators, faculty, and staff members. The objective is to reduce, reuse, and recycle solid waste; to educate the SCSU community relative to a progressive solid waste management program; and to develop a national model -- an exemplary program for export and use around the nation.

Coastal Pesticide Advisory Committee
The CPAC is multi-disciplinary with both regulators and the regulated community as members. It is an ad-hoc committee. It evolved from a group formed to evaluate fish kills in estuarine waters. In 1986, following several summers in which estuarine fish kills suspected to have occurred as a result of runoff of agricultural pesticides used on tomato fields, it became apparent that a pro-active approach to preventing these kills was needed. In most of the situations where these kills occurred, no pesticide label restrictions had been violated and farmers had operated using best judgment. The majority of the farmers in the coastal zone of South Carolina participate in the Integrated Pest Management (IPM) programs of the CES. The problems arose when unexpected rain occurred immediately after application. Experts from the SCDHEC, Clemson, the SC Wildlife and Marine Resources Department (SCWMRD), now, the SCDNR, and the U.S. Fish and Wildlife Service (UFWS) met monthly to develop preventative strategies.

This small group evolved into a much larger, multi-disciplinary committee, with members representing various regulatory and resource agencies, research institutions, the farming community, and others. Since its inception, CPAC has served as a forum for the exchange of information on a wide range of pesticide related issues. More recently, CPAC has begun to address other pesticide usage/resource protection conflicts which arise in the rapidly developing coastal zone of South Carolina. One of these conflicts is the potential runoff of golf course pesticides, either into the lagoons within the course itself or to adjacent wetlands or waterbodies. Other issues include aquatic weed control, mosquito abatement, and residential pest control. Currently, it remains the goal of CPAC to share information and expertise in a variety of disciplines, with the ultimate goal of protecting coastal resources, while allowing those land uses which require the application of pesticides to prosper.

iii. Applicable Enforcement Mechanisms

SCDHEC will ensure implementation of management measures through a variety of enforceable policies and mechanisms. The SC Pollution Control Act states that "…the Department of Health and Environmental Control shall have the authority to abate, control and prevent pollution." The state relies on this policy when a more specific authority does not exist. There are specific regulations which

address various aspects of the agricultural NPS program. Many of the cited policies are federal laws which are implemented in South Carolina through federal programs with state and local input. The exceptions are the state regulations which address agricultural animal facilities chemigation and the pesticide control laws.

South Carolina's Animal Waste Management Program

The South Carolina Department of Health and Environmental Control is the lead regulatory agency for the agricultural waste and confined animal programs. This agency has authority under the SC Pollution Control Act to promulgate regulations regarding such programs in South Carolina. The Department has been regulating animal operations since the mid 1960s. The PCA requires a permit before a discharge to the environment (surface or groundwater) may occur and it also requires a written permit before any new waste treatment or handling system at an animal operation may be built or operated.

As of February, 1999, South Carolina had approximately 1,300 active facilities permitted under the state "no-discharge" permit program. Of these there are about 500 poultry facilities, 200 turkey facilities, 360 swine facilities, 150 dairy and beef facilities, and 90 miscellaneous animal facilities.

In 1996, the SC Confined Swine Feeding Operations Act (Title 47, Ch. 20, 1976 Code) was enacted by the SC Legislature. This state statute deals primarily with large swine facilities and includes provisions for public notice requirements, consideration of cumulative impacts, lagoon design, setbacks from property lines, waters of the state (excluding ephemeral and intermittent streams), potable wells, etc. Provisions for regulation of odors and other "nuisances" are included in the law. The Act also mandated SCDHEC to promulgate regulations to implement the Act and to broaden its scope to include "other animals" (cattle and poultry). As a result, "Standards for the Permitting of Agricultural Animal feeding Facilities" (R. 61-43) became effective in June of 1998.

SC Regulation 61-43 governs the permitting of commercial animal growing operations. These state regulations describe the permit requirements, the administrative permit process including public notice, specific design criteria, and setbacks for animal operations. In general, all commercial animal feeding operations with 30,000 pounds or more of normal production animal live weight at any time must be permitted by he SCDHEC. The Act and regulations are enforced through issuance and enforcement of facility permits and implementation of Agricultural Waste Management Plans.

The Regulation is quite comprehensive in its requirements, which act to prevent NPS pollution from confined animal operations and waste utilization on agricultural land. For example, Section 100.80 describes setback requirements for facilities and lagoons. Separation distances (or setbacks) from waters of the state, drinking water wells, and adjacent properties vary based on the type and size of animal operation and apply to animal growing areas, lagoons, and waste utilization areas.

South Carolina does not issue NPDES permits for animal feeding operations since lagoons or other waste handling systems at all animal operations are designed to store all manure, normal rainfall, and the 25 year, 24 hour storm event generated between land applications and maintain one foot of freeboard. Surface water discharges from animal waste systems are not allowed under any circumstances. Therefore, any discharge to surface waters is a violation of state law. Instead, South Carolina issues an individual state "no-discharge" permit to each animal growing operation based on the review of a site specific agricultural Waste Management Plan. The US Department of Agriculture's Natural Resource Conservation Service (NRCS) is available for assistance in the preparation of the plan. The plan consists of the method of handling, storing, treatment (if necessary), and utilization or disposal of the manure, litter, and dead animals generated at the facility. A crop management plan, vector abatement plan, odor

abatement plan, soil monitoring plan, groundwater monitoring plan (if required), manure sampling plan, and emergency plan are all included in the Waste Management Plan. All commercial animal feeding operations with more than 10,000 pounds of live animal weight, except ranged operations, are required under the state program to have and implement a waste management plan.

Facilities with more than 10,000 pounds and less than 30,000 pounds of normal production animal live weight must have and implement a waste management plan that complies with SC Regulation 61-43. The plan must be submitted but a permit is not required unless specifically required by the South Carolina Department of Health and Environmental Control. Facilities with 30,000 pounds and more of normal production animal live weight must have and implement a waste management plan that complies with SC Regulation 61-43. Before construction and operation may begin, the plan must be submitted to the South Carolina Department of Health and Environmental Control for review and permit issuance.

An applicant proposing to construct a new or expand an existing animal growing operation is required to notify nearby property owners of their intent to construct a new agricultural facility or expand an existing agricultural facility. All permit issuances are public noticed by the SCDHEC by placing the decision in a newspaper of general circulation in the area of the facility.

Enforcement of the regulations and compliance with Waste Management Plans is provided through R.61-43 and the Pollution Control Act. The SC PCA gives the South Carolina Department of Health and Environmental Control authority to issue orders and administer penalties for violations of the law or permits issued under the authority of the law. Civil penalties can be up to $10,000 per day per violation while criminal penalties can be up to $25,000 per day per violation and/or imprisonment up to five (5) years.

The South Carolina Department of Health and Environmental Control takes an aggressive approach to enforcement on agricultural animal facilities. Enforcement orders are issued with penalties, as appropriate, for violations of permits. Agricultural operations are included in the state inspection program for wastewater facilities. Inspections are carried out by SCDHEC Environmental Quality Control District technicians. About 1,600 agricultural inspections per year. In addition, an Animal Waste Specialist within the Bureau of Water provides technical assistance in the implementation of Waste Management Plans. The Specialist concentrates effort within a major watershed on a rotation basis. Within a watershed in a given year, the Specialist identifies and locates, using a GPS and GIS system, all agricultural animal facilities in the watershed. All known facilities are then visited, providing technical assistance toward meeting requirements of Waste Management Plans and, when needed, making enforcement recommendations.

The following specific, expeditious milestones will be completed statewide by SCDHEC staff as part of the animal waste management plan program:

Milestone	Complete
Provide 125 preliminary site inspections annually	1999-2003
Perform 1200 routine follow-up site inspections annually	1999-2003
Provide 75 final site inspections of animal waste facilities annually	1999-2003
Respond to 180 animal waste facility related complaints annually	1999-2003
Prepare new and reissue 150 state agricultural facility permits annually	1999-2003

Pesticide Control Act and Chemigation Act
Clemson University administers the South Carolina Pesticide Control Act, and the Chemigation Act. The Department of Pesticide Regulation (DPR) and Fertilizer and Seed Certification at Clemson University are responsible for education of the public and enforcement of the Acts. The Pesticide Control Act regulates storage, sale, use, quality control, and numerous other areas related to pesticides. The Chemigation Act regulates application of chemicals through irrigation equipment.

Under Rules and Regulations of the South Carolina Pesticide Control Act, all applicators who apply restricted use pesticides, all pesticide dealers, and all structural pest control operators must pass a rigorous licensing examination. The DPR has staff that sample and test pesticides being sold in South Carolina. The DPR also has personnel involved in complaint and compliance inspections regarding pesticide use and enforcement of the Chemigation Act. They inspect pesticide users to ensure that pesticides are being applied consistently with label directions, and they also check irrigation equipment to ensure that growers follow the backflow prevention requirements of the Chemigation Act. Pesticide dealers are inspected to ensure that only licensed applicators purchase "restricted use" pesticides.

The DPR believes that education is the key to preventing violation of the Pesticide Control Act and contamination of the environment. Therefore, a great deal of effort goes toward education, including instruction of pesticide applicators on proper pesticide application techniques and proper disposal of empty pesticide containers.

DPR personnel are involved with compliance and enforcement of federal mandated programs, such as the Worker Protection Standard which deals with worker safety and correct pesticide usage. Protection of endangered species from pesticide misuse is also administered by the DPR through the Endangered Species Act. The Department maintains an educational outreach approach to train applicators, agricultural workers and the general public regarding safe pesticide usage. Complaint and compliance inspections are performed by DPR staff in cases involving worker safety, endangered species and improper pesticide usage. In addition, DPR has a statewide groundwater sampling program for pesticides. Groundwater samples are taken by DPR personnel from private well owners and tested for pesticide contamination. The Department's goals are to identify problem pesticides that leach into groundwater and to identify such areas to the state.

iv. Management Measures

The following Section describes the intent, applicability and purpose of the six management measures recommended by EPA to abate NPS pollution from agricultural activities. Management measures are defined as economically achievable measures to control the addition of pollutants from NPS activities,

which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. They are described in ***Guidelines Specifying Management Measures For NPS In Coastal Waters,*** EPA Office of Water, 1993. The lead agencies for program implementation of the management measures are also discussed in this Section.

South Carolina implements the agricultural management measures through a number of existing regulatory mechanisms and voluntary programs including the development of conservation plans as described in the state's Soil and Water Districts Law, which is administered by SCDNR-LRCC, consistent with the NRCS ***Field Office Technical Guide.*** Research and education programs at Clemson University provide technology transfer for new methods and practices directly to the farming community.

Best management practices (BMPs) for each management measure are examples of practices used in South Carolina that meet the goals of the management measures. South Carolina will use appropriate and effective BMPs drawn from ***Guidelines Specifying Management Measures for Coastal NPS Waters*** (EPA, 1993***), Farming For Clean Water in South Carolina, A Handbook of Conservation Practices*** (SCDNR, 1997***)*** and the current version of the ***Field Office Technical Guide*** of the USDA Natural Resources Conservation Service. Other applicable sources will be applied as they are available. In addition, new and innovative technologies will be applied when it is agreed that they are effective in reducing NPS pollution. Although some generic practices would be applicable to many farms, most sites must be evaluated on a case-by-case basis by the appropriate agency or agencies.

Erosion and Sediment Control Management Measure

This management measure applies to activities that cause erosion on agricultural land and other land converted to agricultural uses. Soil erosion is one of the leading causes of water pollution in the United States and in South Carolina. The goal of this management measure is to minimize the delivery of sediment from agricultural lands to receiving waters. Landowners have a choice of two approaches: (1) apply the erosion component by conservation management through such practices as conservation tillage, strip cropping, contour farming, and terracing or (2) design and install a combination of practices to remove settleable solids and associated pollutants in runoff for all but the largest storms.

SCDNR, in conjunction with the individual Soil and Water Conservation Districts, implement this management measure. The Districts work closely with the USDA-NRCS, share office space in most counties, and have over 50 years of experience in addressing erosion control on agricultural lands. Technical assistance from the USDA-NRCS field offices provides site specific help on erosion issues for the landowner. Financial assistance for implementation of this management measure is provided by NRCS through several sources such as EQIP and CRP. Section 319 funding through SCDHEC provides funding for demonstration of BMPs and agricultural watershed projects, and now with increased allocations, for installation of effective BMPs for water quality restoration in high priority watersheds. The applicable enforceable policy and mechanism to implement the management measure is the SC PCA Sections 48-1-20 and 50.

Management Measure for Facility Wastewater and Runoff from Agricultural animal facility

Animal waste contaminates waterbodies with pathogens and nutrients. The management measure for all new facilities and existing facilities over a certain size is to limit discharges from agricultural animal facilities to waters of the state by storing wastewater and runoff caused by all storms up to and including the 25-year, 24-hour frequency storm. The measure also specifies management of stored runoff and solids through proper waste utilization and use of disposal methods which minimize impacts to surface and groundwaters. This management measure is implemented through the Swine Act of 1996 and enforceable regulations, namely R.61-43 by SCDHEC. Complementary assistance and education programs are also provided. All agricultural animal facilities are covered.

Nutrient Management Measure

This measure calls for development and implementation of comprehensive nutrient management plans. The

fundamentals of a comprehensive nutrient management plan include a nutrient budget of the crop, identification of the crop, identification of the types and amounts of the nutrients necessary to produce a crop based on realistic crop yield expectations, and an identification of the environmental hazards on the site. Other items called for in the measure include soil sampling, and other tests to determine crop nutrient needs, and proper calibration of nutrient equipment.

The strategy for implementing this measure includes the necessary mechanisms for ensuring that the state administered permitting program and associated technical assistance efforts work together to fully achieve the management measure for confined livestock operations and nutrient management. The Natural Resources Conservation Service (NRCS) helps livestock producers in the preparation of Waste Management Plans and Waste Utilization Plans for compliance with SCDHEC regulations for concentrated animal operations. For Waste Utilization Plan preparation, the NRCS requires analysis of the nutrient content of the soil in the field on which the waste is to be spread. If the phosphorus content in the soil is greater than 500 lbs/acre, NRCS requires that other sites be selected.

Studies in South Carolina have shown that application of animal manures, which contain the nutrients nitrogen and phosphorus, to farm land may increase the phosphorus concentrations in the soil to above tolerance levels while nitrogen levels remain within acceptable limits. This is because manure has approximately the same concentration of N and P, but plants take up greater amounts of nitrogen. This points to the necessity for soil testing prior to application, and may lead to manure application rates based on phosphorus content of the soils rather than nitrogen content, which is the common method. Nitrogen based commercial fertilizer would then be applied as needed.

Clemson University Cooperative Extension Service (CES) works with producers to ensure that they are applying the proper amount of fertilizer to fields and pastures. CES conducts analyses of soil samples for a fee of $5 per sample. The nutrient recommendations are then forwarded to the producer. Also, CES makes available production guides for specific crops. These production guides give nutrient recommendations for the crop. The production guides are the result of extensive research by the CES, Clemson University and USDA. In addition to the soil testing program, CES also runs a Soil Nutrient Management and Integrated Crop Management Planning Program which support the goal of better nutrient use and management. Additionally, the Clemson University Fertilizer Advisory Committee provides advice to Clemson on fertilizer recommendations. The Committee, which is not established by statute, is administered by the Soils faculty and the Department of Fertilizer and Seed Certification Services. Members of the Committee represent county Extension staff, the fertilizer industry and farmers. The applicable enforceable policy and mechanism for this management measure is the SC PCA, Sections 48-1-20 and 50.

Pesticide Management Measure

This management measure is designed to minimize water quality problems by reducing pesticide use, improving the timing and efficiency of application, preventing backflow of pesticides into water supplies, and improving calibration of pesticide spray equipment. Integrated pest management (IPM) is another component of the management measure. IPM strategies include evaluating current pest problems in relation to cropping history, previous pest control measures, and applying pesticides only when an economic benefit to the producer will be achieved. If pesticide applications are necessary, they should be selected based on their effectiveness to control the target pest, as well as consideration of their environmental impacts such as persistence, toxicity, and leaching potential.

Clemson University Department of Pesticide Regulation (DPR) personnel are involved with compliance and enforcement of federal mandated programs such as the Worker Protection Standard which deals with worker safety and correct pesticide usage. Protection of endangered species from pesticide misuse is also administered by the DPR through the Endangered Species Act. The Department conducts educational outreach to train pesticide applicators, agricultural workers and the general public, regarding safe pesticide usage and proper disposal. Complaint and compliance inspections are performed by DPR staff in cases involving worker safety, endangered species and improper pesticide usage. In addition, DPR has a statewide groundwater sampling program for pesticides. Groundwater samples are taken by DPR personnel from privately owned wells and tested for pesticide contamination. The Department's goals are to identify problem pesticides that leach into groundwater and to identify areas of the state where groundwater is most

susceptible to contamination.

The State Pesticide Advisory Committee plays an important role with regard to implementation of this management measure. This committee was established pursuant to the SC Code of Laws §46-13-150 (1979), Agriculture Pesticide Control Act. The sixteen members of the committee are appointed by the Governor on the recommendation of various organizations. The committee advises the Director of the DPR of all problems relating to the use and application of pesticides. This may include pest control problems, environmental or health problems related to pesticide use, and review of needed legislation, regulations and agency programs. The Pesticide Control Act is administered by the DPR.

Grazing Management Measure
This management measure is applied to activities on range, irrigated and non-irrigated pasture and other grazing lands used by domestic livestock. The focus of the grazing management measure is on the riparian zone including stream banks, wetlands, estuaries, ponds and lake shores. Grazing management on range, pasture and other grazing lands above the riparian zone and within the watershed is implemented to achieve protection of the zone. The goal of this measure is to reduce the disturbance to sensitive areas, reduce sediment, animal waste, nutrients and chemicals to surface water while providing food, water and cover for the domestic livestock being grazed. Impacts of grazing livestock can be minimized or eliminated by applying the components of a conservation management system which would be developed around a prescribed grazing management plan and may include fencing, limiting access to streams, alternative water sources, nutrient management and stock walkways or trails.

The goals of this management measure are met by the existing programs offered by the USDA-NRCS and the Conservation Districts. In addition, both CES and USDA-NRCS staff offer technical assistance to livestock operators regarding proper pasture management.

Irrigation Water Management
This management measure is to be applied to activities on irrigated lands, including agricultural crop and pasture land, orchard land, specialty cropland, and nursery cropland. The goal of this measure is to reduce NPS pollution of surface waters caused by irrigation. Chemigation is the addition of one or more chemicals to irrigation water. Chemigation of crops is addressed in the South Carolina Chemigation Regulations. These regulations were written to supplement the Backflow Prevention Act §46-1-140, also called the Chemigation Act. These laws help limit the threat of groundwater contamination that may occur when using chemicals in irrigation water.

The SCDHEC and DPR are the agencies with lead responsibilities for implementing this management measure. In addition to the efforts of SCDHEC and DPR, the NRCS works with producers to calculate water usage needs. Also, CES production guides give recommendations for water needs for specific crops. Inherent in these recommendations is the consideration of applying only the amount of water needed for crop growth and discouraging over-application to prevent excessive runoff.

v. Significant Results of Section 319 Projects

Farming for Clean Water, a Handbook for Conservation Practices
This handbook was produced by the SCDNR LRCD under a Section 319 grant as a BMP manual for South Carolina farmers. This 135-page book contains a wealth of information about agricultural NPS pollution prevention methods for farming. It describes systems of management measures that farmers can use to protect water quality and conserve valuable natural resources by using the "whole farm approach". It was developed and reviewed in close coordination with more than 50 agricultural, environmental, and natural resource agencies, organizations, and associations, as well as by farmers, before publication. It addresses all of the prescribed Management measures generally, and guides the user toward more technical sources of information such as the NRCS or local Soil and Water Conservation District. It is used as the primary source of information for agricultural BMPs for NPS management.

The Handbook was selected for use in the appendix of the National Association of State Departments of Agriculture (NASDA) Research Foundation's model guide for resource management planning. The Guide was developed for use by agricultural consultants, organizations, state and federal agencies, and service providers that are interested in starting a voluntary, comprehensive resource management program for individual farmers and ranchers. To date, 18,000 copies of the manual have been distributed as follows: each of the 46 Conservation Districts for local distribution to each county extension office for local distribution, farmers at a variety of state meetings of farm related organizations, each high school vocational agricultural teacher in SC for use as text (3100 copies), numerous individuals, agencies, organizations, and companies nationwide, each of 129 libraries statewide, SC Senate and House Agriculture and Natural Resource Committees, Clemson University and technical colleges for use as text, National Assoc. of State Dept. of Agriculture for use an appendix to national resource management guide (500).

Management of Nutrients in Poultry Waste

Concerned about the over-application of nutrients in areas where confined animal operations are concentrated, a Section 319 project was conducted by Clemson University Soils Faculty investigating, among other things, the management of nutrients in poultry litter. This project, funded in fiscal year 1993, was conducted in Oconee County. The focus of the nutrient management study was to determine the nitrate-nitrogen and phosphorus status of the fields which received poultry litter applications. Soil samples for the study were collected from Oconee County farms where poultry litter was used as a field application. Results from the study revealed that nitrate-nitrogen levels in the soils of the fields averaged 66 lbs/acre, not excessive for fields used for crop production. However, phosphorus was concentrated in the soil at 226 lbs./acre, a very high level. This is because poultry litter contains roughly equal amounts of nitrogen and phosphorus, but plants use greater amounts of nitrogen. The study concludes that agronomic rates of poultry litter application may need to based on content of phosphorus rather than nitrogen, the traditional method. A similar project conducted by Clemson University Soils Faculty in the Fork Creek watershed in Chesterfield County produced the same conclusions

Precision Farming Reduces Agricultural Runoff

Growing concern over the environment has placed agriculture in the crossfire of debate because of the

vast amounts of chemicals and fertilizers used in production. One way to deal with such concerns is to lessen amounts of chemicals used, thus resulting in less effect on the environment. Precision farming holds tremendous potential to achieve this goal without reducing yields.

Precision farming considers a field as many small areas rather than as one homogenous area. The key ingredient of precision farming is a Global Positioning System (GPS). GPS allows the farmer to keep track of location in the field during chemical applications or crop harvest. Incorporating GPS and a Geographical Information System (GIS) along with yield monitors and variable rate equipment, field data can accurately be collected, analyzed, and used to make management decisions.

In a recent study conducted at Clemson University and partially funded through a Section 319 NPS grant, various strategies for using precision farming in real cropping situations were examined. This was accomplished by developing crop models that were used to produce yield maps. Once the model was evaluated, 24 years of crop yields were simulated based on common soil types for a given field site and weather. Also examined were various farm management scenarios and differences in corn value versus nitrogen cost.

Results showed that benefits were very site-specific, being dependent upon both soil conditions and soil type arrangement within a field. The precision farming scenario produced the most difference between value of corn and nitrogen cost. Even though other management scenarios produced slightly higher yields on some occasions than did the precision farming, the difference was not large enough to offset the added nitrogen cost. Not only could a farmer lose money, but also could over apply nitrogen. When making proper management decisions concerning a farm, inputs such as fertilizers can be minimized or used more efficiently without reducing yields. This is particularly significant to potential users of precision farming as they determine whether or not it can be justified in a particular field operation.

Precision farming has great potential for future farming operations. A better understanding of how crops perform in response to weather and how to cater to their needs on a site-specific level will make precision farming more practical. In addition, this type of system offers potential to minimize water quality impacts from agricultural runoff.

Cattle Ramp Demonstration

Sediments are a major component of NPS runoff in the Catawba River corridor. One source of the sediment runoff is from riparian areas that have been disturbed, such as cattle access to streams and other sources of water supply. The cattle movement produces unstable banks, leading to increased erosion. Fencing and a cattle ramp provide limited access to the waterbody, thus allowing the riparian zone to stabilize. Section 319 funds provided for demonstration of this BMP to farmers in York County. As a result of the field day held in conjunction with the project, eight local farmers applied for EQIP funds for cattle ramp installation on their property.

Impact of Hog Lagoon Effluent and Turkey Litter on Loblolly Pine Stands in the Coastal Plain

Increased demand for forest products coincides with the increasing need to find alternative disposal/recycle/utilization options for various forms of animal waste including swine lagoon liquids and turkey litter. Currently, almost all of this animal waste is applied to agricultural land . In some localities of South Carolina, available land is becoming scarce. Forested land therefore represents an additional source on which to dispose of the waste. When the waste is applied at an agronomic rate, a BMP for nonpoint source control is being utilized.

A loblolly pine plantation located in Clarendon County is the project site for the application of liquid swine manure. The results of the first two applications of 120 lbs PAN/acre and 60 lbs PAN/acre shows

promising results for the application of livestock waste to crops other than conventional agricultural row crops. Groundwater and soil are being monitored for major plant nutrients, Cu, Zn, and As. Sample results indicate concentrations that are well below the permissible levels. The majority of the applied nutrients from the manure are accumulating in the top six inches of the soil profile. Implications of the project show a promising future for the establishment of an annual application rate that is environmentally safe, as shown by the water and soil parameters.

Camping Creek/Bush River Watershed Project

In 1990, the South Carolina State NPS Task Force selected the Camping Creek/Bush River Watershed for the development of an agricultural NPS prevention program. The resulting program was the Camping Creek/Bush River Agricultural Watershed Project. The project assisted farmers with planning and implementing BMPs to reduce surface runoff and groundwater leaching of agricultural NPS pollutants such as sediment, nutrients, and pesticides. The project began with Section 319 funding in FY-1990 and concluded in 1998.

BMPs encouraged through the project, range from wise nutrient management to proper pesticide selection. For example, there are over 60 livestock and poultry production operations in the Camping Creek/Bush River Watershed, producing annually approximately 75,000 tons of manure and related animal waste rich in nitrogen and other nutrients. The project demonstrated to farmers how the waste material can be used as a fertilizer for agricultural lands and at the same time lower production costs and reduce nutrient runoff. Participating farmers are required to develop a nutrient management plan, or update their existing plan by working with the cooperating state agencies.

The project addressed proper nutrient management and utilization through demonstration of lagoon pump out and traveling gun irrigation systems that allow animal waste storage lagoons to be pumped out with the waste applied to adjacent fields and pastures. When lagoons were pumped, waste was applied at a rate that did exceed the nutrient requirements of the crop and did not result in runoff. SCDNR LRCD purchased the equipment and the Newberry Soil and Water Conservation District stored, and maintained the equipment and provided it to farmers at a nominal fee to cover costs.

In addition, a computer program developed by Clemson University assists farmers in making pesticide selections based on the specific soil and water conditions of their farm. This information helps farmers meet pest control needs and minimize the potential for pesticide runoff and groundwater infiltration.

The project also included other components such as water quality monitoring and mapping project activities. LRCD has developed a computer-based Geographic Information System (GIS) to record and track the activities of the project and DHEC is conducting the water quality monitoring. This data will help to determine how well the BMPs are performing in this watershed and provide information applicable to similar situations.

As with any watershed program, education, training and demonstration are integral to the success of the project. "Exporting" information and technology to other watersheds helps ensure continued protection and restoration of South Carolina waters from potential or current agricultural NPS pollution. To date, no water quality problems in downstream Lake Murray have been shown to be caused by upstream farming in the Camping Creek/Bush River Watershed, and the cooperating project agencies will continue to work with farmers to keep it that way.

Since implementation of the project in 1990, nonpoint source pollution from agricultural activities has lessened thus improving water quality in the watershed. At the beginning of the project, 48 confined animal operations in the watershed were not in compliance with regulations. As of 1993, 26 of these operations were in compliance and the 22 others were working with the state and their natural resource conservation district to gain compliance. The farm community's interest in the project is widespread. For example, in April 1995, approximately 80 people attended a demonstration of the agricultural waste lagoon pump-out equipment, and by the end of 1996, at least 112 long-term contracts between landowners and USDA had been signed, and the following best management practiced had been installed: conservation tillage

on 18,000 acres, proper land application systems on 3,600 acres, tree plantings on 2,000 acres, conversion of cropland to forest land on 1,000 acres, and eight new agricultural waste lagoons. The NRCS estimates that 94,000 tons of soil have been saved in the watershed through the use of BMPs, and that annually 75,000 tons of animal waste are being properly used according to South Carolina guidelines (i.e., application rates, slopes, and time of year).

The Department of Health and Environmental Control maintains an ambient water quality monitoring station in the headwaters of Lake Murray that receives the flow from the Bush River-Camping Creek watershed. Sampling data at the station gathered between May and October 1992 indicated statistically significant reductions in nutrients (total phosphorus and nitrate-nitrite) occurred after the project's implementation. These decreases could be attributed to reductions in the amounts of nutrients reaching the waterbody from nonpoint sources. Similar data gathered at that location between 1992 and 1996 indicates continued statistically significant reductions in nitrate-nitrite. While reductions in total phosphorus were not noted during the latter five year period, neither were statistically significant increases, even though it is likely that activities contributing to nutrient inputs increased into the watershed during that period.

Farm-A-Syst Environmental Self Assessments

The Clemson Extension Service now has two environmental self-assessments available through the South Carolina Farm-A-Syst program. These two assessments are Managing Animal Waste and Handling and Storing Pesticides. They are available through each county Extension office and is funded in part through Section 319 of the Clean Water Act through DHEC Animal waste management self-assessment is an important part of the Farm-A-Syst program. This voluntary program helps farmers evaluate activities and conditions on farms that could be a threat to drinking water and to water quality in nearby streams, rivers, lakes, groundwater and other sources. It also helps in the understanding of the importance of managing animal wastes from water quality, health and environmental perspectives. This self-assessment on handling and storing pesticides is an important part of the Farm-A-Syst program. This voluntary program helps the farmer to evaluate conditions on-farm that could threaten drinking water quality and water quality in streams, rivers, lakes, and other sources. It also explains why pesticides should be applied, stored, and disposed of properly for water quality, health, environmental, and legal reasons.

Waste Pesticide Survey and Collection

The Clemson University Cooperative Extension Service conducted this project using FY-1991 Section 319 funding. First a survey was conducted among farmers about pesticide storage and disposal. Survey results were rather surprising. Almost 4,000 farmers statewide have waste pesticides stored on their farm. Based on the median amount of 25.5 pounds of solid waste pesticide per individual, this translates to almost 100,000 pounds of waste pesticide stored on farms statewide. Of these, almost 60 percent are unlabeled, and therefore of unknown origin. In response, Clemson developed and implemented a comprehensive education effort concerning proper pesticide storage and disposal. This included training, display booths at agricultural related meetings and events including the SC State Fair, production and presentation of a 25-minute video, and informational material such as brochures, poster and stickers.

Trifluralin Study

During 1997, the Earth Sciences and Resources Institute at the University of South Carolina conducted a one-year study to characterize the transport of Trifluralin, a commonly used herbicide in South Carolina, and nitrate from a cotton field in the Upper Coastal Plain of South Carolina. Trifluralin was detected in surface runoff four months after application at concentrations below those reported by others in similar regions. The amount of Trifluralin in runoff was determined by of a storm event sampling and sediment concentration in runoff, versus Trifluralin concentration in soil. Trifluralin degraded in soil by a pseudo first and second order decay rate, consistent with other research. Trifluralin was not detected in a surficial aquifer, or vadose zone, confirming its resistance to lateral movement in soil with water. Nitrate was detected in runoff at concentrations below the EPA MCL of 10 mg/L in drinking water similar to other studies in comparable physiographic regions. Nitrate was detected in the surficial aquifer at concentrations below the EPA MCL OF 10 mg/L, but high enough to be a concern for nutrient enrichment of surrounding surface waterbodies.

This study demonstrates the value of risk assessments regarding Source Water Assessment and Protection programs required under the Safe Drinking Water Act and the effectiveness of BMPs and the need for their maintenance.

Water Quality Awareness for Horse Owners

Each year, a single horse generates eight to ten tons of manure, enough to fill a 12-by-12-foot stall to a depth of eight feet. The typical nutrient composition of horse manure is 13 pounds of nitrogen, five pounds of phosphorus, and 13 pounds of potassium. When the manure reaches a waterbody via NPS runoff, it can contribute to water quality degradation, thus the waterbody cannot be used for its designated purposes.

A 1996 Section 319 project targeted horse owners in the Piedmont of South Carolina for an education information program concerning best management practices for this activity. The objectives of this project have been successfully completed. Initially, a survey of industry manure handling practices and available educational materials was undertaken. Then, one thousand questionnaires were mailed to horse owners in order to determine where horses were being housed and how they were managed. From these questions, it became apparent because of the proximity of people to horse barns and horses that cleanliness and good housekeeping were priorities for horse owners. Therefore, they (horse owners) are doing an acceptable job of dealing with manure and its disposal.

A brochure entitled ***Water Quality Awareness for Horse Owners*** was developed and printed. The brochure described the best management practices for handling horse manure with the least opportunity for surface water contamination. Five-thousand brochures were printed and they proved so popular that a second printing of five thousand has been completed.

Field days were held at Riverbend Equestrian Park in Greenville, at the Florence Horse Center near Florence and at the Black Bottom Stables, Ladson. The people at each of these facilities became knowledgeable of composting and methods for protecting surface water. In fact, the facilities added composting bins and filter strips to decrease their chance of pollution. This commitment was very evident to the attendees at the field days. Even though the crowds were not large, there was positive feedback about the amount of learning that the attendees indicated with the exposure to new information.

The project was presented at the 18th International Symposium of the North American Lake Management Society in November, 1998 in Banff, Alberta, Canada. It was well received. There were several requests for the material on the project BMPs. Also, the material was presented at the South

Carolina Horsemen's Association meeting in February, 1998. It proved to be another great opportunity to get the brochure in the hands of horse owners.

In retrospect, this project was early in the learning curve for the horse industry and will have a very positive effect, as horse owners talk about manure disposal. This is particularly true in rapidly developing areas of the state. Extension agents are getting a better understanding for manure handling methods and are key to helping with disposal in suburban areas.

vi. Five Year Action Plan for Agriculture

The following five year action plan outlines the specific tasks to be accomplished as part of the agricultural NPS program. These activities lead toward meeting long-term goals and ensure continuing compliance and implementation of BMPs to protect ground and surface waters from agricultural activities in South Carolina.

Table 7.3 Five-year Action Strategy for Agriculture

ACTION ITEM	*LONG TERM GOAL REF.*	*RESPONSIBLE AGENCY(S)*	*MILESTONE(S)*	*M*
1. Increase rate of compliance with voluntary management measures to 70 percent by 2003	#,3,4,5,6,8,9,16	Collective endeavor by all cooperating agencies and agricultural producers.	Increase compliance rate by 2 percent per year until 2003.	Funded with from NRCS (Sec. 319) a assistance fr agencies and
2. Implement agricultural watershed projects according to the SC Watershed Restoration Action Strategy in highest priority watersheds to address water quality parameters of concern (see WRAS strategy)	#2,3,4,5	Collective endeavor by cooperating agencies. SCDHEC lead agency for Sec. 319 funded projects, NRCS lead agency for EQIP and other USDA financial assistance programs.	Implement projects in five watersheds identified in WRAS for FY-1999 and FY-2000. Implement projects in five watersheds to be determined by WRAS process in FY-2001 and FY-2002 Same for FY-2003 and 2004	Funded with from NRCS (Sec. 319) a assistance fr agencies and
3. Seek funding for Farm and ForestLands Protection Act	#6,8	SCDNR-LRCC	FY-2000 legislative session	State approp
4. Assure compliance with Standards for Permitting Agricultural Animal facilities (Reg. 61-43) by:	#4,10,13,16	SCDHEC		
Issuing 500 permits for new animal waste facilities or upgrades to existing facilities by 2003		SCDHEC	Anticipate issuance of 100 permits/yr for next 5 yrs.	R.61-43 SCDHEC In Div.
Evaluating current regulations and revising as needed		NRCS/SCDHEC	Revised regulations promulgated in year 2001	R.61-43 SCDHEC In Div.
Preparing 325 waste mgt. plans for growers by 2003		NRCS/SCDHEC	Anticipate preparing 65/yr. WMPs over next 5 yrs.	NRCS provi assistance
Performing 6000 inspections of agricultural animal facilities annually: **1. Inspect all wet facilities in state annually** **2. Inspect all facilities in the Broad Basin by 9/99** **3. Inspect all facilities in Pee Dee Basin by 3/2000** **4. Facilities adjacent to 303(d) listed waterbodies will be given priority for compliance**		SCDHEC	1200 agricultural animal facility inspections annually by SCDHEC District and Central Office Staff	

ACTION ITEM	*LONG TERM GOAL REF.*	*RESPONSIBLE AGENCY(S)*	*MILESTONE(S)*	*M*
5. Apply Conservation Management Systems (CMS) on various land uses and for various activities **Apply CMS on 212,500 acres of cropland by 2003.** **Protect 135,000 acres of cropland against erosion by 2003.** **Apply nutrient mgt. systems on 37,500 acres by 2003.** **Install conservation buffer practices on 630 miles of waterbody by 2003.** **Install pest mgt. systems on 42,500 acres by 2003.** **Install irrigation water mgt. To reduce water applied by 12,500 acre/inches by 2003.** **Install prescribed grazing systems on 48,000 acres by 2003.** **Install tillage and residue mgt. Systems on 37,500 acres by 2003.**	#3,4,5,6,14,16	NRCS	<u>NRCS Performance Goals</u> Apply CMS on 42,000 acres of cropland/yr, 12,500 acres of grazing land/yr. Protect 27,000 acres of cropland per yr. against erosion. Apply nutrient mgt. systems on 7,500 acres/yr. nstall conservation buffer practices on 126 miles/yr. Install pest mgt. systems on 8,500 acres/year Reduce irrigation water applied by 2,500 ac/in/yr Install prescribed grazing systems on 9,600 ac/yr Install tillage and residue mgt. systems on 7,500 ac/yr.	NRCS cost technical ass Sec. 319 fu Assistance c agencies inc S&WCDs,D

b. Forestry

i. Categorical Description

This Section describes the programs and policies in South Carolina that address NPS pollution from silvicultural activities. These programs implement the management measures recommended by the U.S. Environmental Protection Agency (EPA) for abating the water pollution in runoff from forestry activities. Existing educational, monitoring, and regulatory programs are described. This chapter also provides a comparison of the EPA recommended management measures and the best management practices (BMPs) outlined in *South Carolina's Best Management Practices for Forestry*. This manual, prepared by the SC Forestry Commission, addresses all the federally recommended management measures.

The forestry NPS program in South Carolina is primarily one of voluntary compliance with BMPs, with reliance on a water quality protection law, the SC Pollution Control Act, to address problem operations. Two additional programs regulate activities in forested wetlands and the application of pesticides. The state relies on the SC Pollution Control Act to address violations of water quality standards. This approach is working in South Carolina based on the available data regarding water quality impacts from forestry activities and the results of ongoing monitoring of BMP compliance.

Additional programs are being implemented to improve compliance over the existing 92 percent compliance rate with BMPs on managed forest sites. The statewide forestry program will be supplemented by additional compliance monitoring and outreach activities implemented on a watershed basis in conjunction with the SCDHEC Watershed Restoration Action strategy. An action plan for implementing the forestry program and a schedule for implementation are included.

The forestry program in South Carolina currently meets the goals of Section 319 of the Clean Water Act and Section 6217 of the CZARA. Expanded outreach and compliance monitoring programs will ensure compliance with BMPs for forestry activities. No additional laws or regulations are necessary to manage NPS from forestry activities.

Forests comprise a major portion of South Carolina's land base. Sixty-six percent, or 12.6 million acres, of the state's total land area is in timberland. Over 90 percent of the forests in the state are owned by private landowners, and 2.2 million acres or about 18 percent are forested wetlands. Non-industrial private forest landowners control 72 percent of the state's forest area. The forestry industry controls 19 percent.

Silvicultural practices associated with road access, harvest, and regeneration of timber present the most significant potential for NPS pollution from Forestry activities. NPS pollution resulting from logging and other forestry activities is a concern because forest land represents a large portion of the state's land base and impacts can be significant if BMPs are not used. Also, forest product demand has changed with hardwood pulp coming into higher demand.

Silvicultural activities have the potential to degrade the state's waters through the addition of sediment, nutrients, organics, elevated temperature, and pesticides. Erosion and subsequent sedimentation are the most significant and widespread NPS problems associated with forestry practices. Sudden removal of large quantities of vegetation through harvesting or silvicultural practices can also increase leaching of nutrients from the soil system into surface waters and groundwaters.

ii. NPS Programs for Forestry

Programs to abate or control NPS pollution from forestry activities are primarily the responsibility of the SC Forestry Commission (SCFC) and the United States Department of Agriculture's Forest Service (USFS), with other agencies having supplementary programs. The SCFC is responsible for managing forestry practices on state forests and also provides technical assistance to non-industrial private landowners. The USFS is involved with silvicultural activities only on the National Forests within the state. The United States Department of Agriculture-Natural Resources Conservation Service also provides technical assistance to units of government, landowners, and land users. The Farm Service Agency (USDA-FSA) provides funding for forestry cost-share programs. In addition, several forest industries offer technical assistance to non-industrial private landowners.

The SCFC is the lead agency responsible for planning and developing state BMPs. Close cooperation among the SCFC, the SC Forestry Association (SCFA), Clemson University Cooperative Extension Service (CES), and other interested groups and individuals has allowed a broad representation of the forestry community to have input into the development of BMPs utilized in the state. The process used by the SCFC to develop state forestry BMPs obtained nearly universal acceptance of the *SC BMPs Manual* within the forestry community. South Carolina developed and published the revised BMP Manual with funding from SCDHEC and EPA through Section 319 of the Clean Water Act. The SCFC has also evaluated compliance with BMPs using Section 319 funding.

The forest industry also has a leadership role with regard to addressing NPS pollution and other management issues related to forest land. The members of the American Forest and Paper Association (AF&PA) recently adopted *Sustainable Forestry Principles and Implementation Guidelines*. By implementing the Sustainable Forestry principles, the participating forestry industries will implement the management measures recommended by EPA.

State Lands
The SC Forestry Commission applies the practices of the Erosion, Sediment, and Stormwater Management Plan on state forest lands owned by the Commission. Also, as required by the Stormwater Management and Sediment Reduction Act, SCFC recommends these same practices to other state agencies that own forest land The Forestry Commission does not have regulatory authority over privately owned lands; however, they have been involved in promoting the use of voluntary BMPs since the early 1970's.

Federal Lands
The U.S. Forest Service (USFS) has land management authority over the two National Forests in the state, the Sumter National Forest in the Piedmont and Mountain regions and the Francis Marion National Forest in the Coastal Plain region. Forest Land and Resource Management Plans on South Carolina's National Forests identify the need to use BMPs as the primary means to meet water quality objectives. The voluntary BMPs contained in the SC BMPs Manual are incorporated as performance standards into the Forest Standards and Guidelines in the Forest Plans to address NPS pollution. Standards and Guidelines are also developed to aid in the management of other resources including soil productivity, wildlife, recreation, etc.

Silvicultural and other activities on the National Forests are given a site specific evaluation for environmental effects including NPS pollution Impacts. Maintenance or improvement of water quality is a major concern in the Forest Plans that lead to activity prescriptions, contract preparation, implementation and analysis of final results. Information on practices and activities is provided through public notification and review. The monitoring, training of personnel, and coordination with others (for example Southeastern Forest Experiment Station, Clemson University, and Coweeta Hydrologic Laboratory) are important factors in the success of this program.

Forested Wetland Program
Normal ongoing silvicultural activities which involve deposition of dredged or fill in wetlands are exempt from Section 404 of the Clean Water Act provided the activity complies with BMPs. Should the activity not

comply with BMPs, a permit will be required and all the standards and provisions under Section 404 apply. The SC BMP Manual includes a separate listing of the 15 federally mandated BMPs for wetland road construction. The Manual recommends additional BMPs which are an interpretation of the federal BMPs.

Two state permit programs also apply to wetland areas. A SCDHEC permit is necessary for all activities which alter critical areas of the state's coastal zone (salt marsh wetlands and estuarine waters), including constructing roads or bridges for forestry activities. Similarly, a navigable waters permit, administered by SCDHEC must be issued if a bridge or cable crossing is necessary for silvicultural activities which occur in state navigable waters. A State Water Quality Certification or water quality review is included as part of these permits and comments from other resource agencies are also considered in the permit review process. The critical areas permit process is discussed in detail in Section d, Marinas and Recreational Boating, and the navigable waters permit is addressed in Section f, Hydromodification.

Pesticide Control Program

Included under the Public Service programs offered through Clemson University is the administration of the South Carolina Pesticide Control Act, and the Chemigation Act. The Department of Pesticide Regulation (DPR) at Clemson University is responsible for education of the public and enforcement of the Acts. The Pesticide Control Act regulates storage, sale, use, quality control, and numerous other areas related to pesticides. The Chemigation Act regulates application of chemicals through irrigation equipment. Under Rules and Regulations of the South Carolina Pesticide Control Act, all applicators who apply restricted use pesticides, all pesticide dealers, and all structural pest control operators must pass a rigorous licensing examination. The DPR has staff that sample and test pesticides being sold in South Carolina. The DPR also has personnel involved in complaint and compliance inspections regarding pesticide use and enforcement of the Chemigation Act. They inspect pesticide users to ensure that pesticides are being applied consistently with label directions, and they also check irrigation equipment to ensure that growers follow the backflow prevention requirements of the Chemigation Act. Pesticide dealers are inspected to ensure that only licensed applicators purchase "restricted use" pesticides.

Education and Outreach

The SCFC and the SCFA are currently cooperating in an effort to promote more awareness and use of BMPs. In March of 1994, the SCFC completed production of the ***South Carolina's Best Management Practices for Forestry*** manual. Technical input was provided by a BMP Development Committee representing the Forestry Commission, Clemson University, forest industry, and the U.S. Forest Service. SCDHEC provided funds from the State NPS Management Program Section 319 grant to support development of the manual which EPA has approved. The SCFC encourages landowners, industry foresters, consulting foresters, loggers, contractors, and others to follow the BMPs outlined in this publication. The Forestry Commission has foresters assigned to each county in the state to assist landowners with proper management of their forest land.

A Timber Operations Professional (TOP) program for logger accreditation is offered in South Carolina. The Program is a joint effort of the South Carolina Forestry Association, the SCFC, CES and the State Board for Technical Education. Three 8-hour sessions are taught: Forestry Best Management Practices, OSHA approved First Aid and Safety, and Business Management. Loggers must attend all three sessions in order to receive accreditation. Due to the early success of the program and the high interest level from forest industry, the program has expanded. It is offered at technical colleges in the state at least three times each year, and additional sessions are held upon request for forest industry and landowner groups. As of October 1998, 45 TOP programs have been held, and 1,235 loggers, foresters, and forest landowners have completed the course. The program is open to logging company owners and foremen. The cost of attending the complete course is $150. This program is supported by many forest industries, who are encouraging their contract loggers to become accredited.

Through the cooperation of the SCFC, the SCFA, and CES, training programs using video tapes and slides are being used to educate landowners and the forestry community on BMPs and to promote the use of BMPs. Separate programs are available for general and specific audiences. The SCFA also conducts training sessions that will utilize these materials to make loggers more aware of BMPs and the importance of their use.

The SCFC is responsible for providing technical assistance on forestry cost-share programs administered by the USDA-CFSA under the Forestry Incentives Program. The BMPs outlined in *South Carolina's Best Management Practices for Forestry* are followed in all technical assistance provided under these programs.

Monitoring and Tracking Efforts

Since 1990 the SCFC, with funding from SCDHEC and EPA under Section 319 of the Clean Water Act, has monitored BMP compliance on harvested sites in South Carolina. Four reports were produced: ***A Survey of Voluntary Compliance of Forestry Best Management Practices (1991)***, ***Implementation and Effectiveness Monitoring of Forestry Best Management Practices on Harvest Sites in South Carolina* (1993)**, ***Implementation Monitoring of Forestry Best Management Practices on Harvested Sites in South Carolina* (1994)**, and ***Implementation Monitoring of Forestry Best Management Practices for Site Preparation in South Carolina* (1996)**. A new survey, initiated in 1997, is examining compliance with BMPs for harvesting and site preparation.

The first BMP survey evaluated 100 logging sites in the spring of 1990. This survey determined that 84 percent of the sites evaluated met minimum or better BMPs. The survey also made some specific recommendations regarding future needs: more education on the benefits of BMP implementation; more specific guidelines on BMPs; especially Streamside Management Areas (SMA); more regular monitoring of BMPs; SCFC should assume BMP monitoring responsibility; and more landowner education regarding Section 404 of the Clean Water Act.

For the second survey both BMP effectiveness and implementation were monitored. A BMP compliance inspection was completed on 177 harvested sites that were chosen at random across South Carolina in 1991. This report concludes the following with regard to environmental impacts both onsite and offsite: "During 1990 and 1991, silvicultural BMPs were implemented on 84.7 percent of the harvesting operations in South Carolina. Of the five major BMP categories, compliance was highest for log deck and road BMPs, 97.7 percent and 92.0 percent, respectively. Compliance was lowest for road stream crossings and SMZs (Streamside Management Zones), 41.7 percent and 72.4 percent, respectively. Compliance with harvesting BMPs was 89.8 percent with major problems consisting of logging under wet soil conditions and skid trail crossings using soil as fill material.

Two hundred sites were evaluated for compliance with BMPs in the third survey. The 1994 report demonstrated some improvement over previous surveys. Overall BMP compliance in South Carolina, when weighted by physiographic region, was 89.5 percent as compared to 84.7 percent compliance in the last survey. Of particular note was the improvement for road stream crossings and SMAs to 79.5 percent and 79.9 percent, respectively.

In 1995, the SCFC received funding through another Section 319 grant to initiate a new monitoring program to establish a baseline for the level of compliance with silvicultural site preparation BMPs in South Carolina. Site preparation typically utilizes mechanical equipment to plow or cultivate the soil for weed control and to prepare a planting bed. In this survey, 177 sites that had been site-prepared within one year prior to the onsite evaluation were selected for monitoring. The site inspection covered compliance with BMPs in the following four broad categories: (1) mechanical treatments, (2) herbicide applications, (3) prescribed burning, and (4) minor drainage. Overall compliance with site preparation BMPs was 86.4 percent. The major problem areas identified were improperly constructed fire lines, lack of protection for the SMA, and the use of intensive mechanical treatments on slopes of 20 percent or more. To address the problems identified in this monitoring survey, the SCFC has increased educational efforts for site preparation contractors.

In 1997, a new monitoring study was initiated to examine compliance with both harvesting and site preparation BMPs. This two-year study is designed to follow 200 harvested sites over a two-year period to examine compliance with harvesting and site preparation BMPs, as well as to determine the interval between the timber harvest and site preparation. Other issues that will be addressed include the period of time before site stabilization occurs, most desirable tree species for reforestation, and preferred methods of site preparation.

The first phase of this study has examined compliance with harvesting BMPs and was completed in mid-1997. Overall BMP compliance rose to 92 percent, and the major problems found on monitoring sites were harvesting of the SMA, logging debris in the stream channel, and poorly designed skid trail stream crossings. The second phase of this survey will be completed in 1999.

Additionally, a Courtesy Exam Program is in place in each of the SCFC's three regions. The focus is on NPS pollution prevention through the offer of courtesy BMP exams. Landowners, foresters, and loggers are encouraged to participate. Regular aerial flights along drainages will supplement the courtesy exam effort. Courtesy exams will be offered to landowners and loggers associated with those sites located from aerial flights. Inspections are made by specially trained environmental foresters on sites where courtesy exams have been requested.

The SCFC plans to expand this monitoring program, as resources are available, to ensure BMPs are monitored in a manner that will provide a scientifically and statistically valid evaluation of the statewide implementation of BMPs. The results of these surveys will direct the education efforts of the SCFC and other organizations involved in outreach. Additionally, the results of these surveys will continue to provide the information necessary to evaluate progress towards higher levels of compliance with the voluntary BMP implementation program on South Carolina's forest lands.

iii. Management Measures

All of the management measures in this chapter pertain to lands where silvicultural or forestry operations are planned or conducted. The following describes the intent, applicability and purpose of the 10 management measures recommended by EPA to abate NPS pollution from forestry activities. The state

uses best management practices described in ***South Carolina's Best Management Practices for Forestry*** (SCFC 1994, 1999) to implement the management measures. The South Carolina programs and policies that implement various components of the forestry management measures are also discussed. Where applicable, enforceable policies and mechanisms have been listed for those portions of the program which are required by existing law.

Preharvest Planning

The planning process components of this management measure apply to commercial harvesting on areas greater than 5 acres and any associated road system construction or reconstruction conducted as part of normal silvicultural activities. The component for ensuring implementation of this management measure applies to 10 acre harvesting activities and road construction activities that involve SMAs or stream crossings. This measure does not apply to harvesting conducted for precommercial thinning or noncommercial firewood cutting. The objective of this management measure is to ensure that silvicultural activities, including timber harvesting, site preparation, and associated road construction, are conducted without significant NPS delivery to streams and coastal areas. Components of this measure are addressed throughout the *SC BMPs Manual*.

Streamside Management Areas (SMAs)

SMAs should be established for perennial waterbodies as well as for intermittent streams that are flowing during the time of operation. SMAs are particularly needed for intermittent streams in the sandhills, piedmont, and mountains during wet conditions since these are the times of maximum transport of sediments from the harvest unit and when highest flows are present in intermittent streams. Primary and secondary SMAs are recommended by the *SC BMPs* Manual. The primary SMA resides along each side of the stream channel. The secondary SMA provides additional buffering in sloping terrain. The recommended primary SMA is 40 feet on each side of the stream. Along trout streams, which are especially sensitive to sediment and temperature increases, the primary SMA increases to 80 feet. As slopes increase, recommendations for the width of the secondary SMA increase as follows: 40 feet for slopes between 5 percent and 20 percent, 80 feet for 21 percent to 40 percent slope, and 120 feet for slopes greater than 40 percent.

Road Construction/Reconstruction

This management measure applies to road construction and reconstruction operations for silvicultural purposes. The goal of this measure is to minimize delivery of sediment to surface waters during road construction/reconstruction projects. Disturbance of soil and rock during road construction/ reconstruction creates a significant potential for erosion and sedimentation of nearby streams and coastal waters. Some roads are temporary or seasonal, and their construction does not involve the high level of disturbance generated by permanent, high-standard roads. However, temporary or low-use roads still need to be constructed in such a way as to prevent disturbance and sedimentation. Proper road design and construction can prevent road fill and road back slope failure, which can result in mass movements and severe sedimentation. Proper road drainage prevents concentration of waste on road surfaces, thereby preventing road saturation that can lead to rutting, road slumping, and channel washout. Two Sections of the SC BMPs Manual, Stream Crossings and Forest Road Construction, recommend BMPs which meet the goals of this measure. Useful tables that recommend diameters for culverts based on drainage area size and physiographic region, and recommend spacing for drainage structures based on slope are provided. Additional practices are also recommended in other Sections of the SC BMPs Manual.

Road Management

This measure applies to active and inactive roads constructed or used for silvicultural activities. The

objective of this management measure is to manage existing roads to maintain stability and utility and to minimize sedimentation and pollution from runoff-transported materials. If roads are no longer in use or needed in the foreseeable future, an effective treatment is to remove drainage crossings and culverts if there is a risk of plugging or failure from lack of maintenance. Throughout the *SC BMPs Manual*, practices are recommended with address road management issues.

Timber Harvesting
This management measure applies to all harvesting, yarding, and hauling conducted as part of normal silvicultural activities on harvest units larger than 5 acres. This measure does not apply to harvesting conducted for precommercial thinnings or noncommercial firewood cutting. The goal of this management measure is to minimize sedimentation resulting from the siting and operation of timber harvesting, and to manage petroleum product properly. Logging practices that protect water quality and soil productivity can also reduce total mileage of roads and skid trails, lower equipment costs, and provide better road protection and lower road maintenance. Careful logging can disturb as little as 10 percent of the surrounding soil surface. The BMPs are described in the Timber Harvesting Section of the SC Manual. Cable yarding is not a practice commonly used in the state, consequently, BMPs for that activity are not addressed.

Site Preparation and Forest Regeneration
This management measure applies to all site preparation and regeneration activities conducted as part of normal silvicultural activities on harvested units larger than 5 acres. Regeneration of harvested forest lands not only is important in terms of restocking a valuable resource, but also provides water quality protection from disturbed soils. Tree roots stabilize disturbed soils by holding the soil in place and enhancing aggregation, thereby decreasing the potential for slope failure. Vegetating a disturbed site slows sheetflow runoff, which in turn decreases erosion and associated sedimentation in adjacent waters. The *SC BMPs Manual* recommends specific site preparation techniques based on slope and proximity to water.

Fire Management
This measure applies to all prescribed burning conducted as part of normal silvicultural activities on harvested units larger than 5 acres and for wildfire suppression and rehabilitation on forest lands. The goal of this measure is to minimize potential NPS pollution and erosion resulting from prescribed fire for site preparation and from the methods used for wildfire control or suppression. Prescribed fire is a useful forestry tool. However, precautions must be taken to prevent unwanted damage. In South Carolina, the Forestry Commission must be notified prior to burning. The *SC BMPs Manual* addresses this issue.

Revegetation of Disturbed Areas
This measure applies to all disturbed areas resulting from activities including harvesting, road building, and site preparation conducted as part of normal silvicultural activities. Disturbed areas are those localized areas within harvest units or road systems where mineral soil is exposed or agitated such as road cuts, fill slopes, landing surfaces, cable corridors, or skid trail ruts.

Revegetation of areas of disturbed soil can successfully prevent sediment and pollutants associated with the sediment (such as phosphorus and nitrogen) from entering nearby surface waters. The vegetation controls soil erosion by dissipating the erosive forces of raindrops, reducing the velocity of surface runoff, stabilizing soil particles with roots, and contributing organic matter to the soil, which increases soil infiltration rates. The *SC BMPs Manual* provides recommendation for seeding, mulching and fertilizing roads, fills, and other disturbed areas by physiographic region and season.

Forest Chemical Management
This measure applies to all fertilizer and pesticide applications (including biological agents) conducted as part of normal silvicultural activities. Chemicals used in forest management are generally pesticides and fertilizers. Since pesticides may be toxic, they must be mixed, transported, loaded, and supplied properly and their containers disposed of properly in order to prevent potential NPS pollution. Since fertilizers may also be toxic or may shift the ecosystem energy dynamics, they must also be properly handled and applied. Pesticide application is directly regulated as by the SC Pesticide Control Act, Section 5.2.1

Wetlands Forest
This management measure applies specifically to forest management activities in forested wetlands, including those currently undertaken under the exemptions of Section 404(f). This measure supplements the previous management measures by addressing the operational circumstances and management practices appropriate for forested wetlands. Normal forestry activities on established forestry operations are exempt under Section 404.This management measure is not intended to prohibit these silvicultural activities in forests. Forested wetland road construction and minor drainage are separate Sections of the *SC BMPs Manual* which address activities in wetlands. However, throughout the manual, practices are recommended to address activities that are conducted in wet areas.

iv. Significant Results of Section 319 Funded Projects

Effectiveness of Forestry BMPs for Maintaining Water Quality in the Piedmont
This study, conducted by Clemson University Forest Resources Department, looked at the effects of BMPs, mainly site preparation BMPs, on water quality. Four watersheds (three forested, one control) were used to test the BMPs on three common methods of forest harvest and regeneration. Streams in each watershed were monitored over time and during rain events. The sites where BMPS were applied showed that the BMPs significantly reduce sediment reaching streams.

Silvicultural BMPs Demonstration
The Pickens SWCD implemented demonstrations and conducted education and training on the use of silvicultural BMPs to reduce erosion and sedimentation from timber harvesting, site preparation and replanting in foothills and mountain region of the state. Watersheds included Georges Creek Watershed (Hydrologic Unit 03050109-050), North Saluda River Watershed (Hydrologic Unit 03050109-010), and Middle Saluda Watershed (Hydrologic Unit 03050109-020). Activities were conducted in conjunction with Greenville SWCD, SCDNR LRCD, NRCS, SC Forestry Commission, silvicultural equipment companies, and landowners. Activities were publicized with the SC Forestry Association. The Forestry Commission was directly involved with the development and implementation of the project. The project focused on the unique soil, terrain and rainfall conditions in foothill and mountainous watersheds, using the Forestry Commission's publication, ***South Carolina's Best Management Practices for Forestry***, as a guide.

v. Action Plan for Forestry

The SCFC with assistance from the SCFA and Clemson University Cooperative Extension Service are instrumental in ensuring forestry activities do not affect water quality. The United States Forest Service also implements specific tasks on National Forest lands. The primary components of the program are a consensus BMPs Manual, a monitoring program, a complaint response program, a BMP compliance program, and an educational program. A pilot of the courtesy exam program began in the SCFC's coastal region in April of 1995.

The forestry NPS program will be implemented primarily through existing programs that include voluntary use of BMPs coupled with education and outreach. BMP compliance monitoring, along with water quality monitoring and evaluation as part of the state's Watershed Water Quality Monitoring Strategy, will continue to define areas where silvicultural practices may adversely affect water quality in South Carolina. Directed monitoring assessments, courtesy exam programs and outreach efforts will be implemented as resources are

available and in accordance with actions recommended by the WRAS. These efforts will target specific problems and issues more suitable to watershed level solutions.

SCDHEC, SCFC, and the USFS developed a Memorandum of Understanding in 1990 concerning NPS Management. The three agencies agreed to work together to share technology, implement the NPS program, and coordinate efforts where appropriate relative to National Forests in South Carolina.

SCDHEC and SCFC developed a Memorandum of Understanding in 1997. Under the terms of the MOU, SCDHEC will investigate complaints regarding the impact of forestry activities on water quality and take enforcement action if warranted. SCDHEC will consult with SCFC regarding proper implementation of BMPs on sites under investigation. The SCFC and SCDHEC will work cooperatively on sites where poor compliance with BMPs has increased the potential for negative impacts to water quality. SCDHEC has and will continue to enforce the provisions of the Pollution Control Act to require remediation of uncontrolled sediment runoff. Removal of logging debris from a stream has also been required by SCDHEC. These existing authorities are sufficient to implement the NPS program for forestry and to adequately protect water quality from potential forestry sources of NPS.

The following five-year action plan outlines the specific tasks to be accomplished as part of the forestry NPS program. These activities will ensure continuing compliance and implementation of BMPs to protect ground and surface waters from forestry activities in South Carolina.

Table 7.4 Five-Year Action Strategy For Forestry

ACTION ITEM	*LONG TERM GOAL REFERENCE*	*1999*	*2000*	*2001*	*2002*	*2003*
1 SCFC will analyze BMP compliance monitoring results and complete a compliance rate study of the previous two years' activities.	# 2, 3, 4, 5, 6		X		X	
2. SCFC will continue to implement a courtesy inspection program and inspect a statistically significant portion of the forestry activities in each region.	# 2, 3, 4, 5, 6					
Coastal region		X	X	X	X	X
Pee Dee region		X	X	X	X	X
Piedmont region		X	X	X	X	X
3. SCFC will evaluate the success of the courtesy exam program, i.e., determine the percentage of Forestry activities which are inspected, and the rate of compliance with BMPs on inspected sites.	#16		X		X	
4. SCFC will expand educational efforts to address problem areas identified by monitoring effects	# 2, 3, 4, 5, 6	X	X	X	X	X
5. SCFC will work with counterparts in other states in the Southeast to develop monitoring protocols and standards for compliance inspections.	# 2, 3, 4, 5, 6	X				

6. SCFC and SCFA will encourage the use of the BMPs outlined in the *SC BMPs Manual* on private lands and ensure that these BMPs are utilized on state forests and other state managed land.	# 2, 3, 4, 5, 6	X	X	X	X	X
7. SCFC will continue to develop and implement educational presentations (slide, tape and/or video productions)dealing with silvicultural NPS problems and BMPs to solve those problems.	# 2, 3, 4, 5, 6	X	X	X	X	X
8. Evaluate BMPs and revise them as needed, based on monitoring results and/or new research.	# 2, 3, 4, 5, 6	X	X	X	X	X
9. USFS will incorporate the voluntary BMPs contained in the SC BMPS Manual as performance standards into the Forest Standards and Guidelines in the Forest Plans to reduce NPS problems on National Forest land in South Carolina.	# 2, 3, 4, 5, 6	X	X	X	X	X
10. USFS will ensure quality control in the implementation and effectiveness of BMPs through annual monitoring and training scheduled as needed.	# 17	X	X	X	X	X
11. USFS will provide appropriate information about BMPs to National Forest users.	# 16	X	X	X	X	X
12. USFS will identify and treat historic and existing sources of sediment as funding permits.	# 2, 3, 4, 5, 6	X	X	X	X	X

c. Urban Areas

i. Categorical Description and Extent of Problem

This Section describes South Carolina's urban runoff control programs. These programs implement the various management measures recommended by the EPA for controlling urban runoff. The categories of sources of urban nonpoint pollution that affect surface and groundwaters are: runoff from developing areas; runoff from construction sites; runoff from existing development; onsite disposal systems (septic systems); general sources (households, commercial and landscaping); and roads, highways, and bridges. Specific management measures address each of these categories of runoff. These measures are designed to reduce the pollutants associated with each category.

Urbanization has been linked to the degradation of urban waterways. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses. Suspended sediments constitute the largest mass of pollutant loadings to receiving waters from urban areas. Construction sites are a major source of sediment erosion. Nutrient and bacterial sources of contamination include fertilizer usage, pet wastes,

leaves, grass clippings, and faulty septic tanks. Petroleum hydrocarbons result mostly from automobile sources.

South Carolina has a growing and highly concentrated population. Approximately two-thirds of the state's citizens live in one-third of the state's 46 counties. These 15 counties are located in three regions, or physiographic provinces, namely the Piedmont, the Piedmont-Coastal Plain interface, and the Coastal Plain. Each of these areas is impacted to varying degrees by NPS pollution from runoff originating in developing or urban areas. Rapid urban growth is intensifying these impacts. In the 1980's, the average statewide population growth was 11.7 percent, while the coastal counties had an increase of 22 percent -- nearly double the state rate during the same time period . This continuing development and population growth has the potential to make urban runoff the most significant source of pollution in waters of the state in the future.

ii. Cooperating Agencies and Programs

SC Dept. Of Health and Environmental Control
SCDHEC has a number of statewide programs that address components of urban NPS pollution. The SCDHEC Bureau of Water (BOW)administers three permitting programs which control runoff from new and existing urban sources. These include the Stormwater and Sediment Reduction program, Municipal Stormwater NPDES permits, and Section 401 water quality certification program. Additional controls for urban runoff in the coastal zone are implemented by SCDHEC Oceans and Coastal Resources Management (OCRM) through the State Coastal Zone Management Plan. The SCDHEC Bureau of Environmental Health's (BEH) Division of Onsite Wastewater Management administers the Onsite Sewage Disposal System (OSDS) program for the entire state. The Division oversees the permitting for the installation and management of septic systems.

The BEH oversees the permitting for all OSDS, except for community systems and those containing industrial or commercial process wastewater. The BEH provides coordination and support to the county health departments which are responsible for the day-to-day implementation of program activities, such as site investigations, system inspections, permitting, and enforcement. Statewide program policies are developed and distributed to the 13 District Environmental Health Directors throughout the state for consistency in rule interpretation and implementation. All of the applicable regulations, policies, interpretations, and OSDS design standards are contained in the ***Individual Sewage Treatment and Disposal Systems Reference Guide***. This Reference Guide is compiled in notebook form, is routinely updated, and is for use by all Health Authority staff.

The BOW also manages the ongoing State NPS Management Program established under Section 319 of the Clean Water Act. This grant program funds NPS projects, many of which are focused on urban runoff. Section 319 funds various voluntary efforts, including watershed projects, which address many aspects of the pollution prevention management measure and provide education, outreach and technical assistance to various groups and agencies. Most of the projects are implemented by cooperating agencies.

SC Dept. Of Transportation
This agency has regulatory authority over NPS runoff associated with the construction and maintenance of roads and bridges. SCDOT is the implementing agency for several management measures including Planning, Siting, and Developing Roads and Highways; Bridges Management; Construction Projects Management; and Roads, Highway, and Bridge Runoff Systems.

Natural Resources Conservation Service
USDA Natural Resources Conservation Service through its network of county level field offices provides technical, educational, and financial assistance on non-point source pollution concerns to individuals, groups, and units of government. This assistance is available both for rural and urban dwellers. Planning and implementation assistance is available to implement conservation practices on privately owned land.

Soil and Water Conservation Districts
Some Conservation Districts have received complete program delegation administering the state's Stormwater Management and Sediment and Erosion Control Program. Other conservation districts preform plan reviews and/or provide inspection services for the regulating agencies.

Multi Agency Watershed Projects
Section 319 grant funds are used to implement NPS activities and projects both statewide and in priority watersheds. Cooperating agencies such as conservation districts, other state agencies, federal agencies, universities, and other organizations receive a large portion of the Section 319 grant funds each year to design and conduct projects. Since the program began in 1990, 37 projects and agricultural activities have been implemented by cooperating agencies using financial assistance through Section 319 funding. To date, eleven projects have been implemented in priority watersheds, as shown in the table below.

Table 7.5 Urban Watershed Projects

PROJECT TITLE/LOCATION	***HUC (WATERSHED)***	***IMPLEMENTING AGENCY(s)***
Brickyard Creek Urban Watershed NPS Mitigation	03050201-050	SCDHEC-BOW, SCDHEC-OCRM, Charleston County Govt.
East Cooper Watershed	03050202-070	SCDHEC, SCDNR, Clemson U., Clean Water Action Council, Sea Grant Consortium
Gills Creek Phase 1 and 2	03050110-030	SCDNR, Clemson University, Clemson Cooperative Extension
Goose Creek Reservoir Restoration	03050201-070	Berkeley Co. Soil and Water Conservation District
Implementation of a SC Coast-A-Syst	03040207-030, 03040206-140	Clemson Cooperative Extension Service, Sea Grant Extension, Horry Co .Ext. Office
Rawls Creek NPS Assessment & Education	03050109-210	SCDNR, U. of SC, Congaree Land Trust
Urban Watershed Protection and Enhancement Through Stewardship and Education	03050105-180	Clemson U., Friends of Reedy R., Soil & Water Cons. Districts
Effects of chemical Flux FC counts in Enoree Watershed	03050108-020	Furman University, Paris Mt. St. Pk., Roper Mt. Science Center
Coliform and metals Reduction to Improve Impaired waters in L.Keowee Watershed	03060101-030,050	Friends of Lake Keowee society (FOLKS)
Reduction of NPS in three Impaired Watersheds by Implementation of a SC Home*A*Syst	03040201-150 03050109-100,140 03060101-080,050,030	Clemson U. Cooperative Extension Service, County Extension Offices
Constructed Wetlands for Failing Septic Tanks	03050109-190	East Piedmont Resource Conservation and Development Council, soil and water Conservation Districts, SCANA Corp.

iii. Applicable Enforcement Mechanisms

Stormwater Management and Sediment Reduction Permit Program
The Stormwater Management and Sediment Reduction permitting program has statewide applicability and provides the enforceable policies which allow for implementation of many of the urban management measures. The Stormwater Management and Sediment Reduction Act (SMSRA), SC Code of Laws §48-14-10 *et seq*. (1991 Amendments) requires that runoff from new development, both during and after construction, be properly managed in order to protect the resources of the state. Its provisions apply equally throughout the state and are administered by the SCDHEC. In the eight coastal counties, SCDHEC-OCRM, administers the program. In some areas of the state, a local government has been approved to implement the program. Only one agency, or division of an agency, has stormwater permitting jurisdiction in a geographic area. No overlap exists. SCDHEC maintains oversight of the entire statewide program and can revoke a delegated agency's authority to administer the stormwater program if standards are not maintained.

The program has two levels of administrative review, and three levels of technical evaluation. The administrative levels are a requirement for either a notification or a permit. For projects of 2 acres or less of disturbance, the property owner must submit a simplified stormwater management and sediment control plan to SCDHEC or the delegated agency. A permit is not issued, but SCDHEC has the ability to enforce the plan and inspect the site.

For all projects greater than 2 acres of land disturbance, a permit is required before any land disturbance on the site may occur. Projects between 2 and 5 acres of land disturbance in size must meet the design standards outlined in R.72-307I. In addition to the requirements discussed for projects under 2 acres, post-development peak discharge rates cannot exceed pre-development rates for the 2 and 10 year frequency, 24-hour duration storm events, and discharge velocities must be reduced to a nonerosive velocity flow. A description of the maintenance program for stormwater management and sediment control facilities, including inspections programs, is also required.

Projects involving greater than 5 acres of disturbance must meet all the requirements previously mentioned. In addition, for projects which disturb 10 acres or more draining to a single point, a sediment basin or other practice which meets a removal efficiency of 80 percent suspended solids or 0.5 ML/L peak settleable solids concentration, whichever is less, must be installed. The application for a stormwater permit for projects of 5 acres and greater serves as the Notice of Intent required by the NPDES Stormwater permitting program. Consequently, no application duplication or conflicts exist between the two permitting programs.

The ***South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbing Activities*** (SCDHEC 1997) provides further explanation of the requirements. This handbook is a compilation of existing South Carolina stormwater management regulations and supporting information that applicants will need to proceed through the land disturbance permitting process. The objective of this document is to create a comprehensive reference for individuals who will be submitting a stormwater management and sediment reduction permit application for approval to SCDHEC. The handbook

summarizes the application process and sets forth the minimum standards and design specifications for land disturbing activities that require stormwater permits. The supporting information includes application forms, checklists, sediment control design aids and other useful information. This document references pertinent Sections from the SC Stormwater Management and Sediment Reduction regulations, the NPDES Permits for Stormwater Discharges from Construction Activities (General and Individual permits) and the Coastal Zone Management Program Refinements which are included as appendices.

In addition to the permitting requirements of the SMSRA, the Act allows for implementation of a stormwater utility as a funding mechanism for the operation, maintenance, and management of a community's stormwater program. Stormwater utilities are a useful mechanism for conducting comprehensive watershed management. The purpose of a stormwater utility is to fund a comprehensive plan for stormwater management activities that addresses the control of both stormwater quality and quantity. ***The Stormwater Utility Implementation Manual*** is a "How To" manual that provides an overview for public officials, public works directors and engineers, design professionals, and the general public on the components and steps necessary for the implementation of a comprehensive stormwater utility program.

Upcoming Changes to the Storm Water Program
EPA has promulgated new NPDES regulations that will reduce the size of the disturbed areas needing NPDES storm water permit coverage from five acres to one acre. Once implemented, the federal NPDES storm water program will be essentially the same as the state Stormwater Management and Sediment Control Program except for quantity control (flood control) and activities within the critical area of the coastal zone.

NPDES Stormwater Permits for Municipalities
Medium sized municipalities in South Carolina will receive final permits for their Municipal Separate Storm Sewer Systems (MS4s) in 1999. These Phase I permits are for urban areas with populations greater than 100,000. The entities covered include Richland County and Greenville County, which encompass the state's two largest cities of Greenville and Columbia. MS4 permits will require municipal and county governments to regulate most storm water runoff including construction sites inside their area of jurisdiction.

The permit requires that the permittee develop, implement and enforce a local program to reduce the discharge of pollutants in storm water. The storm water program must satisfy technology requirements including reduction of pollutants to the maximum extent practicable , water quality based requirements of the Clean Water Act, and any other specific conditions or limitations to meet water quality standards.

Currently, the Phase II Storm Water (SW2) regulation is being promulgated in accordance with requirements in the Clean Water Act. SW2 will expand the existing NPDES Storm Water Program (Phase I) universe. Storm Water Phase II permits, for urban areas between 50,000 and 100,000 population, cover about 60 entities in South Carolina. These permits will be drafted as general permits, with a few exceptions, by 2001.

Under Phase II, all municipalities under 100,000 but greater than 50,000 in population that are located within urbanized areas, will be required to have permits. An urbanized area as defined by the Bureau of Census as a place (which can be a city, town, county or borough) and the adjacent densely settled territory that together have a minimum population of 50,000 people. All cities and counties that are located within census defined urbanized areas would be required to obtain permits.

For the municipalities covered under MS4, a major requirement of the program will be the implementation of management practices in six categories:

- Public education and outreach
- Public involvement and participation
- Illicit discharge detection and limitation
- Construction site storm water runoff control
- Post construction storm water management
- Pollution prevention and good housekeeping for municipal operations

The following urban areas (incorporated places and counties) in South Carolina are subject to Phase II permits :

Aiken	Forest Acres	Rock Hill
Aiken County	Fort Mill	South Congaree
Anderson	Georgetown County	Spartanburg
Anderson County	Goose Creek	Spartanburg County
Arcadia lakes	Hanahan	Springdale
Berkeley county	Horry County	Sullivans Island
Burnettown	Irmo	Summerville
Cayce	Isle of Palms	Sumter
Charleston	Lexington County	Sumter County
Charleston County	Lincolnville	Surfside Beach
Clemson	Mount Pleasant	West Columbia
Cowpens	Myrtle Beach	York County
Darlington County	North Augusta	Easley
Dorchester County	North Charleston	Gaffney
Florence	Pickens County	Greenwood
Florence County	Pineridge	Newberry
Folly Beach	Quinby	Orangeburg

Coastal Zone Management Plan

In the eight county coastal zone of South Carolina, SCDHEC-OCRM implements the Stormwater Management and Sediment Reduction permitting program. All of the previously mentioned laws, regulations and programs are in effect. However, the Coastal Zone Management Program (CMP) provides additional controls for projects with the potential to significantly impact coastal waters. These requirements are codified in Chapter III, SC Coastal Management Program Refinements, which were approved by the General Assembly in June of 1993, and the Governor in August of 1993. All

development projects, regardless of size, within one-half mile of a receiving waterbody, must receive a permit prior to any land disturbing activity.

In addition to the permitting requirements for those projects under 2 acres in size which are near the water, the other major difference in the coastal zone is a more stringent design standard. The state runoff storage volume requirement is one-half inch of runoff from the entire site. In the coastal zone, the greater of one-half inch of runoff from the entire site or one inch from the built-upon portion of the site must be stored. Additionally, projects which are within 1000 feet of shellfish beds must retain the first 1½ inches of runoff from the built upon portion of the site. These additional management measures provide protection for two critical areas in South Carolina: receiving waterbodies (riparian areas) and shellfish beds. Additional management measures which address impacts from golf courses, bridges, landfills, and mines in the coastal zone are also codified in the Coastal Management Program Refinements.

Regulations Governing Onsite Disposal System Construction and Maintenance
The regulations governing the onsite program are: R.61-56, Individual Waste Disposal Systems, R.61-56.1, License to Construct or Clean Onsite Sewage Treatment and Disposal Systems and Self-Contained Toilets, and R.61-57, Development of Subdivision Water Supply and Sewage Treatment/Disposal Systems. The applicable statutes include: SC Code of Laws §48-1-10 *et seq*. (1976), Environmental Protection and Conservation Pollution Control Act; §44-1-140(11) and §44-55-810 *et seq*. (1976), Health. A manual, ***Uniform Standard for Final Inspection*** was developed by the Division of OSDS and serves as the guidance for making final inspections of new systems.

The PCA and above referenced regulations govern various components of OSDS construction and maintenance. They therefore require compliance with management measures. Components of the regulations include requirements for site evaluation, separation distances, construction standards, and inspections.

South Carolina Water Quality Certification Program
Codified in R.61-101, it provides mechanisms for requiring the implementation of various stormwater management measures. This certification is triggered by a federal permit resulting in discharge to "waters of the United States", and is also included in state navigable waters and critical area permits. The following conditions are routinely placed on all water quality certifications:

- The applicant must implement best management practices (BMPs) during construction to minimize erosion and migration of sediments off-site. These practices may include use of mulches, hay bales, silt fences, or other devices capable of preventing erosion and migration of sediments. All disturbed land surfaces must be stabilized upon project completion.
- The applicant must comply with the approved county Erosion and Sediment Control and/or Stormwater ordinances.
- All excavated materials must be hauled off-site or placed on high land and properly contained and permanently stabilized to prevent erosion.
- Upon completion of construction activities, all disturbed areas must be permanently stabilized with a vegetative cover. This may include sprigging grass, or planting trees, shrubs, vines or ground cover.

Other conditions are applied as required by the specific activity. Management measures which are incorporated as permit requirements are enforceable by the permitting agency. If failure to comply with a condition causes violations of water quality standards, SCDHEC may take enforcement action pursuant to the SC Pollution Control Act.

iv. Management Measure Implementation

The following Sections describe the South Carolina urban NPS program in relation to the management measures recommended by EPA. These measures are broad, goal-oriented statements that reflect what experts agree to be the most effective, economically achievable means to address NPS pollution. South Carolina utilizes a wide variety of BMPs suited to the state's geography and climate to meet the goals of these measures. Descriptions of best management practices (BMPs) to implement the management measures for urban related NPS impacts are found in ***Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*** (EPA, 1993), **The *South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbing Activities*** (SCDHEC 1997), *OSDS* ***Uniform Standard for Final Inspection*** (SCDHEC) ,***Unpaved Public Roads BMP Demonstration Guidelines for Sediment and Erosion Control*** (Ninety Six District RC&D, 1998) and ***SC Home*A*Syst: An Environmental Risk-Assessment Guide for Protecting Water Quality*** (Clemson Extension, 1997). Other documentation may be used as it becomes available. The programs and policies, and the management practices used in South Carolina to implement each of the measures are described below.

New Development Management Measure
This management measure applies to new development, redevelopment, and new and relocated roads, highways, and bridges. This measure is designed to accomplish the following: (1) decrease the erosive potential of increased runoff volumes and velocities associated with development-induced changes in hydrology; (2) remove suspended solids and associated pollutants entrained in runoff that result from activities occurring during and after development; (3) retain hydrological conditions to closely resemble those of the pre-disturbance condition; and (4) preserve natural systems including in-stream habitat.

SCDHEC is the lead agency for implementing this measure in South Carolina. Through the SMSRA and its accompanying regulations, the measure is presently implemented throughout the state. As discussed previously, the State Coastal Zone Management Program provides some additional control in the coastal zone.

Numerous practices can be used to meet the design standards outlined in the state regulations and the program refinements. These practices include wet and dry detention ponds, sediment basins, construction entrances, silt fencing, temporary vegetative stabilization, swales, vegetative filters, buffers, infiltration systems, water quality inlets, constructed wetlands and others as appropriate. Permittees must demonstrate that the design standards (or management measures) are met. The choice of practices is left to engineering judgement and convention. SCDHEC's ***South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbing Activities*** includes sample BMPs in the appendix.

Watershed Protection Management Measure
The purpose of this management measure is to reduce the generation of NPS pollutants and to mitigate the impacts of urban runoff and associated pollutants that result from new development or redevelopment, including the construction of new and relocated roads, highways, and bridges. The measure provides general goals for the state and local governments to use in developing comprehensive programs for guiding future development and land use activities in a manner that will prevent and mitigate the effects of NPS pollution

This measure is broad in scope, and several existing state programs establish a framework for implementing the goals of this measure. The SMSRA allows local governments to request a watershed be designated for special protection. The South Carolina Coastal Management Program provides for watershed protection through the Special Area Management Plan (SAMP) provisions. Both the Ashley

River SAMP and the Charleston Harbor Project have been developed under this authority. The State NPS Management Program also provides opportunities for comprehensive watershed management through Section 319 funding. See the descriptions of watershed projects implemented under this program in Section ii.

Another statewide program which addresses this measure is the Watershed Water Quality Management Strategy (WWQMS) developed and implemented by the SCDHEC Bureau of Water. The WWQMS program, through the individual watershed assessments, analyzes water quality, land use and growth potential information by watershed. From this information possible causes of water quality problems are identified and planned actions to address the problems determined. This process allows priority NPS pollutants to be targeted, and implementation strategies for mitigating the effects of NPS developed.

Existing wetland protection programs in South Carolina also provide significant watershed protection. Both fresh and salt water wetlands have broad protection in South Carolina through the Critical Areas Permitting Program, Coastal Zone Consistency Certification, and state water quality certification of both federal and state permits. This is further addressed in Section f, Hydromodification, and Section g, Wetlands, Riparian Areas, and Vegetated Treatment Systems.

Numerous other efforts are underway by various local and state agencies to conduct localized watershed protection planning efforts. These efforts include resource inventory and analysis. The following is a list of various programs, preserves, inventories, and planning efforts in the state which implement various practices recommended by the EPA to meet the goals of the Watershed Protection measure.

- Comprehensive watershed projects funded under Section 319 and focused on developing BMPs to control urban runoff. See Section c. v. for a complete description of these projects
- Two National Estuarine Research Reserves are located in the state. One is located at North Inlet in Georgetown County, and the other is located in the ACE (Ashepoo, Combahee, Edisto) basin
- The Cape Romain National Wildlife Refuge is a federal reserve composed of barrier islands, salt marsh, and tidal impoundments. It is located at the mouth of the Santee Delta
- The Heritage Trust Section of the South Carolina Department of Natural Resources conducts ongoing acquisition, planning and protection activities throughout the state
- The Charleston Harbor Project, a Special Area Management Project (SAMP) funded by the National Oceanic and Atmospheric Administration (NOAA), will produce a comprehensive watershed management plan for the Charleston Harbor basin
- The Ashley River SAMP was completed in 1992 and established setbacks and buffers throughout that historic basin
- Edisto River Basin Project
- Urbanization and Southeastern Estuarine Systems (USES) study
- The Pee Dee Agricultural Watershed Assessment Project
- Santee River and Coastal Drainage National Water Quality Assessment (NAWQA)

- Scenic Rivers Program

- The SCDHEC, through the Beachfront Management Act, §48-39-350, requires all beachfront communities wishing to receive state assistance to develop a comprehensive local beach management plan. This plan must include a drainage analysis and plan, a beach access and parking inventory analysis and plan, and an endangered species and critical habitat inventory and protection plan.

- Many local governments also have various ongoing zoning and planning efforts which address aspects of this management measure .

Site Development Management Measure
This management measure applies to all site development activities including those associated with roads, highways, and bridges. The goal of this measure is to reduce the generation of NPS pollution and to mitigate the impacts of urban runoff and associated pollutants from all site development. This measure differs from the New Development management measure, which applies to post development runoff, in that this measure is intended to provide controls and policies that are to be applied during the site planning and review process. These controls and policies are necessary to ensure that development occurs so that NPS concerns are incorporated during the site selection and the project design and review phases. While the goals of the Watershed Protection management measure are similar, the Site Development measure applies to individual sites rather than watershed basins or regional drainage basins.

The Stormwater Management and Sediment Reduction Act requires erosion control plans for all residential, commercial, industrial or institutional land use, unless specifically exempted. These requirements are discussed in the previous Section ii. SCDHEC's **SC *Stormwater Management and Sediment Control Handbook*** contains in its appendix, "Engineering Aids and Design Guidelines for Control of Sediment in South Carolina". The guidelines include easy to use graphs which simplify erosion control design for typical conditions.

Construction Site Erosion and Sediment Control Management Measure
This management measure applies to all construction activities on sites less than 5 acres in area that do not have an NPDES permit, in order to control erosion and sediment loss from those sites. This management measure does not apply to: (1) construction of detached single family homes on a site of one-half acre or more, or (2) construction that does not disturb over 5,000 square feet of land on a site. The goal of this measure is to reduce sediment loadings from construction sites to surface waterbodies.

This measure is very similar in goals and implementation practices to the New Development Management measure discussed above. The **SC *Stormwater Management and Sediment Control Handbook*** should be consulted for specific design criteria, example sediment control practices, and applicability of the State Stormwater Permitting Program.

Construction Site Chemical Control Management Measure
The purpose of this management measure is to prevent the generation of NPS pollution from construction sites due to improper handling and use of nutrients and toxic substances, and to prevent the movement of toxic substances from the construction site. Many potential pollutants other than sediment are associated with construction activities. These pollutants include pesticides (e.g., insecticides, fungicides, herbicides, and rodenticides); fertilizers used for vegetative stabilization; petrochemicals (e.g., oils, gasoline, and asphalt degreasers); construction chemicals such as concrete products, sealers, and paints;

wash water associated with these products; paper; wood; garbage; and sanitary wastes.

The South Carolina Pesticide Control Act (SCPCA), 46-13-10 et seq., regulates the use of all pesticides, which includes both non-restricted and restricted-use pesticides. The SCPCA also governs registration, sale display and storage of all pesticides. The limitation relative to restricted use relates only to individuals having to be certified to purchase and apply restricted use pesticides. For lawn care companies that are using restricted use pesticides, applicators must be certified as a commercial applicator for ornamentals and turf. If they are not using any restricted use pesticides they do not have to be certified. However, anyone who is applying any pesticide is responsible for following the label which equates to state and federal law. The Department of Pesticide Regulation at Clemson University has, via the SCPCA, the full range of enforceable policies and authorities necessary to govern and regulate pesticide use in South Carolina. .

SCDHEC, via the South Carolina Solid Waste Policy Act of 1991, Section 44-96-10 et seq., and the South Carolina Hazardous Waste Management Act, Section 44-56-10 et seq., also regulate disposal and discharge of solid and hazardous wastes. The toxic substances and other wastes used and generated at construction sites are thus regulated depending on how the material is classified. SCDHEC places conditions related to proper storage of materials and a requirement for spill prevention and clean-up plan for large construction projects.

To address the measure with regard to fertilizers, and to educate the construction industry regarding proper use and disposal of chemicals and other wastes, SCDHEC will develop a BMP manual for distribution to surveyors, landscape architects, engineers, developers, contractors, and others associated with construction. This manual will focus specifically on the construction industry and the toxic substances and wastes most commonly found at these sites. Distribution of the manual will occur through all appropriate channels, including workshops and possibly attachment to stormwater permits.

Existing Development Management Measure
This measure applies to all urban areas and existing development. The purpose of this management measure is to protect or improve surface water quality by the development and implementation of watershed management programs that pursue the following objectives:

- Reduce surface water runoff pollution from areas where development has already occurred;
- Limit surface water runoff volumes in order to minimize sediment loadings resulting from the erosion of stream banks and other natural conveyance systems; and
- Preserve, enhance, or establish buffers that provide water quality benefits along waterbodies and their tributaries.

SCDHEC's Watershed Water Quality Management Strategy has as one of its objectives to target areas of existing development which have water quality problems for remediation efforts. The program also identifies waters that are currently meeting water quality standards, but are threatened by encroaching development. The efforts undertaken as part of the implementation of the WWQMS program, therefore, address the objectives of this measure.

The NPDES stormwater permitting program is another mechanism for addressing impacts from existing development. The MS4 permit requires permitting agencies to develop procedures to ensure preventive maintenance through inspection of all stormwater management practices. This requirement is a practice that will meet the goal of the measure to reduce surface water runoff pollution from areas where development has already occurred.

New Onsite Disposal Systems (OSDS) Management Measure
This management measure applies to all new OSDS, including package plants and small-scale or regional treatment facilities not covered by NPDES permits, in order to manage the siting, design, installation, and operation and maintenance of all such OSDS. The purpose of this measure is to protect water resources from pollutants discharged by OSDS. The objective of this management measure is to prevent the installation of conventional OSDS in areas where soil absorption systems will not provide adequate treatment of effluents containing solids, phosphorus, pathogens, nitrogen, and nonconventional pollutants prior to entry into

surface waters and groundwater (e.g., highly permeable soils, areas with shallow water tables or confining layers, or poorly drained soils). In addition to soil criteria, setbacks, separation distances, and management and maintenance requirements need to be established to fulfill the requirements of this management measure.

Although the state no longer uses minimum lot size guidelines, some counties and/or municipalities have adopted the state's former guidelines. For example, Charleston County requires a minimum lot size of 12,500 square feet with a 70-foot front on lots with public water supplies and 30,000 square feet with a 100-foot front for lots with private water supplies. R.61-56 stipulates minimum setback distances which, in effect, establish the minimum lot size for OSDS installed statewide. Under R.61-56(V)(E), the lot where the OSDS is to be installed shall be of sufficient size so that no part of the system will be:

- within 5 feet of a building or property line or under a building, driveway or parking area;
- within a minimum of 50 feet from a private well or within the minimum distance (100 feet) as established by the Health Authority from a public well;
- within 50 feet of the mean high water elevation (tidal waters) or ordinary high water (within the banks) elevation (non-tidal waters) of an impounded or natural body of water, including streams and canals;
- within 10 feet of upslope and 25 feet of down slope interceptor drains;
- within 25 feet of a drainage ditch or within 15 feet of the top of the slope of embankments or cuts of 2 feet or more vertical height when the soil absorption trench is to be placed higher in elevation than the invert of a cut, ditch or gully.

R.61-56(V)(B) requires a minimum separation distance of 6 inches between the soil absorption trench bottom and the maximum seasonal high water table. A minimum separation distance of 1 foot is required between trench bottom and rock or other restrictive horizons (R.61-56 (V(C)). In the absence of direct observation of free water during the wettest time of the year, the first evidence of low chroma soil mottles (soil chroma ≤ 2), using the Munsell Color Charts, is the field basis for determining maximum seasonal high water table. Coastal beach sands can have low chroma matrix colors which may not be indicative of maximum water table levels. Therefore, the maximum seasonal high water table for a coastal beach sand is often determined by the presence of other redoximorphic features or by the actual presence of water as monitored during a typical wet season.

Currently, the overall site denial rate for OSDS in the coastal zone averages from 5 percent to 10 percent. If the 6-inch minimum separation distance were increased, it is estimated that in Charleston County the denial rate for OSDS would be 25 percent for a 1-foot separation distance and 80 percent for a 2-foot separation distance (Hatfield, personal communication).

Site evaluations are conducted prior to issuance of a permit. Evaluations include a determination of soil texture, depth to maximum seasonal high water table, depth to rock or other restrictive horizon, and setback distances. Systems are sized on the basis of the most limiting soil texture found in the interval of 0-12 inches below the bottom of the proposed absorption trenches. The maximum effluent loading rate

allowed in any soils is 1.23 gpd/ft ^{2}, regardless of the soil's permeability.

Under R. 61-56, the local health department may also require that site improvements be made as deemed necessary, including: the addition of drainage swales, landscaping and guttering to prevent water ponding on the system; curtain drains to intercept subsurface groundwater; protective barriers to prevent vehicular damage; and the establishment of ground cover to reduce erosion. In an effort to prevent the compaction of the soil in the absorption field area, R.61-56(VIII)(B) requires that all rough grading of the lot be done prior to the installation of the system.

Minimum standards for septic tank and drainfield construction must be met in accordance with R.61-56(VI)-(VIII). Under this regulation, alternative or experimental systems are allowed provided they meet the standards and Demonstration Protocol as set forth by the Onsite Wastewater Management Division. In general, if the water table is greater than 30 inches below the ground surface, a conventional system will be used; if the water table is between 12-30 inches below the ground surface, an alternative system may be used; and if the water table is within 12 inches of the ground surface, an experimental system may be approved for use if certain additional requirements can be met.

The alternative systems generally allow for the shallower placement and depth of trenches but require an increase in the total linear feet to approximate the same total absorptive area as found in conventional designs. Additional site conditions may be required before alternative systems can be used. Alternative systems can be required by the local health department for new systems, as stated in R.61-56(VI)(B) and (VII)(C).

The local health department conducts several inspections to ensure that systems are located, designed and installed properly. As stated above, inspections are made at the time of permit application to determine site suitability and appropriate design. As time allows, some counties do courtesy inspections to determine site suitability at no cost to the owner or potential buyer prior to a permit application. A pre-construction conference is a policy requirement for all large-scale systems to ensure that they are built according to the final approved plans. Inspections are also done during the construction of all commercial OSDS, and during the construction of some of the alternative and experimental systems, but are not routinely required during the construction of conventional systems. Post-construction inspections are conducted for all systems prior to the system being backfilled and covered and prior to final approval, as required by R6.61-56(IV)(C).

The ***Uniform Standard for Final Inspection***, as developed by the Onsite Wastewater Management Division, is the guidance used by the local health department for making final inspections. The state has an additional mechanism to preclude houses or buildings from becoming operational prior to having an approved, constructed OSDS. Sections 44-55-810 and 44-55-820 prohibit any private or public utility, municipality, or electric cooperative from supplying temporary or permanent power to new sites of any mobile, modular, or permanently constructed building or facility unless the sewage disposal method has been approved.

Operating Onsite Disposal Systems Management Measure

This management measure applies to all existing OSDS that are in operation, with one set of exceptions. This management measure does not apply to existing conventional OSDS that meet all of the following criteria: (1) treat wastewater from a single family home; (2) are sited where OSDS density is less than or equal to one OSDS per 20 acres; and (3) the OSDS is sited at least 1,250 feet away from surface waters. The purpose of this management measure is to minimize pollutant loadings from operating OSDS. This management measure requires that OSDS be modified, operated, repaired, and maintained to reduce

nutrient and pathogen loadings in order to protect and enhance surface waters.

Routine maintenance inspections are not required under R.61-56. Inspections are generally only done as a follow-up to citizen complaints regarding individual OSDS or when homeowners request assistance. However, SCDHEC has conducted inspections as part of a Statewide System Performance Survey. The survey inspections were completed in April 1995, and indicated an overall system performance success rate of 93 percent. SCDHEC plans to conduct more of these surveys and inspections in the future.

The development of a mandatory statewide inspection program has been examined by the SCDHEC as a means of ensuring that existing OSDS are functioning properly and are being maintained; however, resources are not currently available to implement such a program. To cover just the eight county coastal zone would require the acquisition of new field technician positions at an approximate cost of $500,000-$600,000 for the first year. The cost would increase each year as new systems are permitted. Before a mandatory inspection and maintenance program is enacted, it would be desirable to have a program to handle the increased amount of septage that would need proper disposal. This would minimize the potential for illegal dumping of septage if cost effective and easily managed disposal alternatives were not available. This would also require additional moneys from the state, although the amount has not yet been determined.

A pilot OSDS operation and maintenance (O&M) program is underway by the city of Folly Beach with the assistance of SCDHEC OCRM. The test pilot area extends from the ocean to the river on the inland side and includes both newer and older homes, and systems that range from trouble-free to problematic. Based on the outcome, plans are to adopt an island-wide O&M ordinance. Some other coastal communities are investigating OSDS O&M programs. Statewide, some maintenance requirements have recently been mandated through city ordinances or homeowner covenants. Efforts will be made to track the results of all of these various programs for voluntary statewide application. Based on the results , local governments will be encouraged to adopt local ordinances that will require participation in an O&M program within a jurisdiction.

Public outreach is being addressed by SCDHEC through the development and distribution of fact sheets and record-keeping folder. The folder, titled ***Septic System: Homeowners Guide & Record keeping Folder*** is designed to educate homeowners on how OSDS function, the environmental and health risks associated with failing systems (with particular regard to the coastal environment), the potential for high homeowner costs to repair a failing system, and the proper inspection and maintenance steps necessary to ensure a healthy, functioning system. In addition, homeowners are discouraged from using garbage disposals and from using septic system additives, and are encouraged to install water saving devices in their homes. The folders are distributed to OSDS owners by local health departments statewide and through the educational efforts conducted by SCDHEC NPS staff.

Another avenue for public outreach is through the Home*A*Syst program. The Home*A*Syst manual devotes an entire chapter to home septic systems, including detailed planning, operation and maintenance information, a risk self-evaluation, and an action checklist to facilitate adoption of low-risk OSDS management.

Just as inspections and maintenance of OSDS are integral to protecting water quality, the repair, modification, or replacement of failing OSDS is also a key component. Under R.61-56(IV)(B)(1) and (3), the county health department is authorized to require a permit for the repair, extension or alteration of an OSDS, as deemed necessary, and may authorize the best possible method of repair to improve system operation, regardless of site conditions. In addition, under R.61-56.1 (III)(A) all repairs must be

done by a SCDHEC licensed contractor, with the exception of owners being allowed to do repairs to their own home system. Alternative repairs can be required by the Health Authority if determined to be the best possible method of repair, pursuant to R.61-56(IV)(B)(3).

Although not their primary function, elevated sand filters and rock/plant systems are two alternative systems that also serve to reduce nitrogen loadings. The use of these systems in proximity to nitrogen-limited waters could be required under R.61-56(IV)(B)(3) when system repairs are being made.

A project is being conducted as part of the state's Watershed Restoration Action Strategy that is installing constructed wetlands for failing septic tank systems. The East Piedmont RC&D, using Section 319 funding is installing the systems as an alternative to standard septic systems on up to 10 sites where conventional systems are failing. The Natural Resources Conservation Service (NRCS) is also funding these alternatives at several locations around the state. The BEH is providing technical advice and support in this pilot program.

Pollution Prevention Management Measure

This measure is intended to be applied to prevent and reduce NPS pollutant loadings generated from a variety of activities within urban areas not addressed by other management measures within this chapter. Source reduction is considered preferable over waste recycling for pollution reduction. Everyday activities have the potential to contribute to NPS pollutant loadings. Some of the major sources include households, garden and lawn care activities, turf grass management, diesel and gasoline vehicles, illegal discharges to urban runoff conveyances, commercial activities and pets and domesticated animals. SCDHEC intends to establish a permanent drop-off site for household hazardous waste in the near future. By reducing pollutant generation, adverse water quality impacts from these sources can be decreased.

SCDHEC's NPS Management Program, and many programs of the Clemson University Cooperative Extension Service (CES) conduct pollution prevention activities. CES's education programs and pamphlets include Enviro-Shopping, Home Composting, Hazardous Household Waste, Recycling, Waste Reduction, and the Master Gardener, Master Composter and Master Waste Educator programs. Specific pollution prevention resources include:

Turning the Tide Citizens Guide SCDHEC has produced an excellent publication ***Turning the Tide - a citizen's guide to reducing NPS pollution***. It describes measures people can take around the home to prevent or reduce urban runoff NPS pollution around the home. The booklet has been updated and is now in its second printing. Almost 20,000 copies have been distributed statewide. There are also two videos with the same title and cover the same material. They are available for viewing upon request. One video is specific for coastal waters while the other is applicable statewide.

South Carolina Home*A*Syst South Carolina Home*A*Syst was developed by Clemson University Cooperative Extension, using Section 319 funding, to educate watershed residents and encourage them to implement responsible homestead management practices for NPS prevention and control. South Carolina Home*A*Syst helps South Carolina residents protect the quality of surface and groundwater by providing them with information to identify and remediate existing or potential problems. Common practices in every home, large or small, new or old, rural or urban, create potential pollution sources that can affect the health of individuals, communities, and the environment. South Carolina Home*A*Syst is a valuable reference for anyone who is concerned about their health and the environment and who is willing to make changes to improve how they manage their homes. Program materials help users to implement simple changes in their household practices in order to prevent NPS

pollution and help maintain the health of their families and the environment. South Carolina Home*A*Syst was written to conform with pertinent South Carolina laws and regulations relevant to the specific chapter topics. It advises users that they must also check for and then comply with any local or county regulations.

South Carolina Home*A*Syst was produced as an 84-page, spiral-bound booklet. The five chapters cover topics important for every resident or homeowner to understand in order to protect water quality. Each chapter contains information about the specified topic and one or more assessment tables to guide users in identifying risky practices around the home. After completing each self-assessment, the user is instructed to refer to the information preceding it to plan for changes to remedy any risks that were detected. Since the printed Home*A*Syst guide cannot answer all questions for all homestead situations, lists of additional references and agency contacts are provided at the end of each chapter.

Four thousand (4,000) copies of South Carolina Home*A*Syst were printed in April 1998, and are anticipated to be disseminated within a year, through local community meetings and statewide or regional conferences. It is currently available for distribution at the Clemson Cooperative Extension County Offices statewide. It is described by name in the municipal stormwater NPDES permits for Richland and Greenville counties to be used in public education and outreach. Multitudinous copies will be distributed by these entities. An interactive version of South Carolina Home*A*Syst is being prepared for dissemination via the Internet.

Management Measure for Planning, Siting, and Developing Roads and Highways

This measure applies to new, relocated, and reconstructed roads and highways. The best time to address control of NPS pollution from roads and highways is during the initial planning and design phase. New roads and highways should be located with consideration of natural drainage patterns and planned to avoid encroachment on surface waters and wet areas. Where this is not possible, appropriate controls will be needed to minimize the impacts of NPS runoff on surface waters.

SCDHEC is the lead agency for implementing this measure for all private sector projects and also for SC Department of Transportation (SCDOT) projects of greater than 5 acres of land disturbance. The SCDOT is responsible for ensuring implementation of this measure for SCDOT projects of less than 5 acres of land disturbance. The following practices are presently implemented throughout the state and the coastal zone.

One of the management practices suggested by EPA to achieve the goals of this measure is to consider the type and location of permanent erosion and sediment controls during the planning phase of roads, highways, and bridges. Under the Stormwater Management and Sediment Reduction Act, R. 72-307, the entity responsible for the construction relocation, or reconstruction of a road is required to submit stormwater management and sediment control plans to the SCDHEC for approval prior to land disturbance. The applicant is required to consider the type and location of permanent erosion and sediment controls during the planning phase. For SCDOT land disturbing activities greater than 5 acres, this practice is required by SCDOT.

An additional practice recommended by EPA to implement the measure is to mitigate all wetlands which cannot be avoided within a highway corridor. This practice is described in CMP Refinements III. C. 3. XIV and is required via SCDHEC-OCRM's certification authority in the coastal zone. Throughout the entire state, the Water Quality Certification program requires similar practices for highway projects that impact wetlands.

Another practice that achieves this measure is a standard SCDOT practice regarding disturbance of natural drainage features. The ***South Carolina Highway Department Standard Specifications for Highway Construction*** states that "frequent fording of live streams will not be permitted; therefore, temporary bridges or other structures shall be used whenever an appreciable number of stream crossings is necessary. Unless otherwise approved in writing, mechanized equipment, except `equipment normally used in the construction of structures or channel changes shall not be operated in live streams." The specifications further state that "when work areas are located adjacent to live streams, the work shall be performed in such a manner to prevent sediment from entering a flowing stream".

Bridges Management Measure

This management measure applies to new, relocated, and rehabilitated bridges. This measure requires that NPS runoff impacts on surface waters from bridge decks be assessed and that appropriate management and treatment be employed to protect critical habitats, wetlands, fisheries, shellfish beds, and domestic water supplies. The siting of bridges is a coordinated effort among state agencies, the Federal Highway Administration (FHWA), the U. S. Coast Guard, and the Army Corps of Engineers. The lead agency for ensuring the implementation of this measure is SCDHEC with additional controls in the coastal zone due to the Coastal Zone Management Program.

In combination, the following practices implement this measure. Under the CMP Refinements III.C., XIII.C., if a bridge in the critical area is to cross an Outstanding Resource Water (ORW) or a Shellfish Harvesting Water (SFH water), the stormwater management requirements shall be based on projected traffic volumes and the presence of any nearby shellfish beds. In the coastal zone, SCDHEC policies dictate that "care should be taken in the design of roads to minimize direct drainage of roadway runoff into adjacent waterbodies." In areas of the state outside of the coastal zone, theWater Quality Certification Program requires minimization of bridge runoff over certain waterbodies.

Bridge maintenance activities are addressed under SCDOTs regulations, which states that "maintenance must be performed in a manner that … neither any onsite nor off-site damage and/or problem is caused or increased." Therefore, SCDOT bridge maintenance activities must be conducted without causing adverse water quality impacts.

Construction Projects Management Measure

This management measure applies to new, replaced, restored, and rehabilitated road, highway, and bridge projects. Erosion and sedimentation from construction of roads, highways, and bridges, and from unstabilized cut-and-fill areas, can significantly impact surface waters and wetlands with silt and other pollutants including heavy metals, hydrocarbons, and toxic substances. Erosion and sediment control plans are effective in describing procedures for mitigating erosion problems at construction sites before any land-disturbing activity begins.

The lead agencies for ensuring implementation of this measure are the SCDHEC and the SCDOT. SCDHEC is responsible for all private sector projects and also for SCDOT projects of greater than 5 acres of land disturbance. The SCDOT shall ensure implementation of this measure for SCDOT projects of less than 5 acres of land disturbance. This measure is required by R.72-305 and 307 (Sediment and Erosion Control Act) for all road, highway, and bridge projects that are constructed by the private sector. Under the Stormwater Permit Program, plans must be submitted to SCDHEC for approval. SCDHEC conducts inspections to ensure compliance with the approved plan or permit.

Under R.63-380(1) "all land disturbing activities under the jurisdiction of the Department [SCDOT] must be performed in a manner that erosion is controlled and sediment is retained on the site concerned

to the maximum extent feasible and stormwater is managed in a manner such that neither any significant onsite nor off-site damage and/or problem is caused or increased." Under R.63-380(2) "all construction plans prepared by or for the Department [SCDOT] must include designs to manage stormwater runoff and control erosion and sedimentation using state-of- the-art practices." R.63-380(3) requires that "prior to the start of construction the contractor must submit in writing to the [SCDOT] Engineer, for approval, his schedule for the accomplishment of temporary and permanent erosion and sediment control and stormwater management for the work to be performed." R.63-380 does not require that SCDOT obtain approval from a separate agency, but rather establishes a self-policing program. The SCDOT has an established internal policy to ensure compliance with the regulation. SCDOT submits plans to SCDHEC for projects of greater than 5 acres of land disturbance. The practices which are used vary on a site-specific basis. However, all of the practices suggested by EPA in the guidance are standard practices and are routinely used on road, highway, and bridge construction projects.

Roads and Bridges Construction Chemical Control Management Measure
This management measure applies to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects. The objective of this measure is to guard against toxic spills and hazardous loadings at construction sites from equipment and fuel storage sites. Toxic substances tend to bind to fine soil particles; however, by controlling sediment mobilization, it is possible to limit the loadings of these pollutants. Also, some substances such as fuels and solvents are hazardous and excess applications or spills during construction can pose significant environmental impacts. Proper management and control of toxic substances and hazardous materials should be the adopted procedure for all construction projects and should be established by erosion and sediment control plans.

The lead agencies for implementation of this measure are the Clemson University- Division of Regulatory and Public Service Programs-Department of Pesticide Regulation and SCDHEC. Currently, all pesticides are regulated under the SC Pesticide Control Act and the associated Rules and Regulations for the Enforcement of the SC Pesticide Control Act. Only licensed applicators may apply restricted use pesticides. In order to become a licensed applicator, an individual must complete a training program in which the individual is instructed, among other practices, how to properly apply and store pesticides. Additionally, under R.61-5 the SCDHEC regulates pesticide disposal and storage of pesticides pending their disposal. Section 401 Water Quality Certification issued for all road construction has a condition requiring development of a spill prevention and clean-up plan.

SCDHEC, via the South Carolina Solid Waste Policy Act of 1991, 44-96-10 *et seq.*, and the South Carolina Hazardous Waste Management Act, 44-56-10 *et seq.*, also regulates disposal and discharge of solid and hazardous wastes. The toxic substances and other wastes used and generated at construction sites are thus regulated depending on how the material is classified. A BMP manual is being developed by SCDHEC which focus specifically on the construction industry and the toxic substances and wastes most commonly found at these sites. Distribution of the manual will occur through all appropriate channels, including workshops and possibly attachment to stormwater permits.

SCDOT policy with regard to fertilizer application as stated in the South Carolina ***Highway Department Standard Specifications for Highway Construction*** is that "fertilizer shall be mixed with the soil to a depth of approximately 2 inches. Fertilizer shall be applied at the rate of 1000 pounds per acre unless otherwise directed". The policy further states that "fertilizer and lime may be applied by approved mechanical spreaders or by hydraulic methods as a mixture of fertilizer and seeds. When fertilizer is applied in combination seed and fertilizer drills, no further incorporation will be necessary". However, no law or regulation exists to require implementation of these practices. The specifications also state that "pollutants such as fuels, lubricants, bitumens, raw sewage and other harmful materials shall not be discharged into or near rivers, streams or impoundments or into natural or man-made channels leading thereto. Wash water or waste from concrete mixing operations shall not be allowed to enter live streams." All the practices listed under this management measure are standard procedure for the SCDOT.

Operation and Maintenance Management Measure
This management measure applies to existing, restored , and rehabilitated roads, highways, and bridges.

Substantial amounts of eroded material and other pollutants can be generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures. This measure is intended to ensure that pollutant loadings from roads, highways, and bridges are minimized by the development and implementation of a program and associated practices to ensure that sediment and toxic substance loadings from operation and maintenance activities do not impair surface waters. The lead agencies for ensuring implementation of this measure are SCDHEC and SCDOT.

SCDOT maintenance practices are established to minimize pollutant loadings from existing roads, highways, and bridges. Establishment of vegetation on shoulder slopes is encouraged to prevent erosion as well as reduce pollutant loadings. The vegetation also serves as a filter to prevent pollutants from reaching streams. Road debris and litter are other potential pollutant sources and are removed as manpower permits. SCDOT uses volunteers to assist in this effort as well as inmate labor manpower.

SCDOT applies pesticides in accordance with SC Pesticide Control Act. To further ensure appropriate use of herbicides at SCDOT maintenance sites, SCDOT has developed a herbicide manual. The manual includes Material Safety Data Sheets and labels for products the SCDOT uses and is distributed through SCDOT maintenance units.

The SCDOT has an inspection program to ensure that general maintenance is performed on urban runoff and NPS pollution control facilities. Under R.63-380(6) "after a project has been completed and accepted in its entirety, the Department's Maintenance Forces must maintain the areas with top priority being to take the necessary steps to insure the continuance of proper erosion and sediment control and stormwater management measures as may be needed to prevent onsite and off-site damages or contamination of watercourses or impoundments."

As with the previous measure, nearly all the practices recommended by EPA to address this management measure are presently standard procedure for the SCDOT.

Road, Highway, and Bridge Runoff Systems Management Measure

This management measure applies to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters. This measure requires that operation and maintenance systems include the development of retrofit projects, where needed, to collect NPS pollutant loadings from existing, reconstructed, and rehabilitated roads, highways, and bridges. Poorly designed or maintained roads and bridges can generate significant erosion and pollution loads containing heavy metals, hydrocarbons, sediment, and debris that run off into and threaten the quality of surface waters and their tributaries.

The lead agencies for implementation of this measure are SCDOT and SCDHEC. Under R.63-380(7), "each Resident Maintenance Engineer must prepare an inventory of existing erosion, sedimentation and stormwater problem areas. This list must be kept current and updated as conditions change. The Resident Maintenance Engineer, in conjunction with the District Office Personnel, must set priorities on

the inventory and make the necessary corrections as time and funds permit."

A guide for practices on unpaved roads is available. *Unpaved Public Roads BMP Demonstration: Guidelines for Sediment and Erosion Control to Improve Water Quality* was published as part of a Section 319 funded project. The manual is a very comprehensive guide preventing sediment runoff from unpaved roads. It is intended for use by local governments and landowners who maintain private unpaved roads. It contains descriptions and detailed drawings of BMPs.

SCDHEC plans to work with SCDOT to determine if TEA-21 funds can be used for retrofit of stormwater controls on existing roadways.

v. Significant Results of Completed Projects

East Cooper NPS Management
The Department of Health and Environmental Control implemented this comprehensive project in a coastal watershed located in Charleston County. Five cooperating agencies implemented various components of the project. The stated goal of the project was to "maintain and enhance existing water quality and uses in this urban and suburban watershed by reducing and/or eliminating NPS pollution." To attain this goal, a primary and several secondary objectives were established. The primary objective was to develop an action plan that would be adopted and implemented at the local level. Secondary objectives included: 1) establishment of a sustainable public information/education program to foster attitude changes in citizens, influence appropriate local government action, and transfer specific information on how to prevent NPS pollution to target audiences, 2) documentation of pollution sources and specific problem areas through monitoring followed by selection of the most responsive, workable and cost-effective BMPs to control the identified sources, and 3) post-implementation monitoring to determine progress toward meeting the goal. Project outputs included: 1) publication and continued implementation of the *East Cooper NPS Management Project Action Plan*, 2) development and production of educational materials specifically for the project such as *Turning the Tide* newsletter, informational video, project poster, various brochures, and curriculum enhancement materials, and 3) development and implementation of a monitoring strategy based on field identification of potential sources or land uses, aerial photography, and analysis of existing water quality data. The Clean Water Council, a local citizens group then implemented the Action Plan in a continuation of phase one of the project. Efforts focused on municipal official and public NPS education. The group also continued and built upon the water quality monitoring begun at the outset of the project in 1991. The recommendations of the Action Plan were incorporated into the City of Isle of Palms Comprehensive Plan.

Brickyard Urban Watershed NPS Mitigation
Brickyard Creek flows through a commercial/ industrial section of Charleston County to the Cooper River. It is highly impacted by urban runoff. A 1990 Section 319 project in this watershed identified the categories and locations of NPS inputs, formed a task force of cooperating agencies, designed a set of watershed specific BMPs, and with the help of the cooperators, forged the *Brickyard Creek NPS Action Plan*. Charleston County government agreed to consider implementing the recommendations of the Plan.

Demonstration of Alternative to Individual Onsite Disposal Systems
This project, undertaken by the SCDHEC Division of Onsite Wastewater Management constructed an innovative wastewater treatment system especially designed for poorly drained soils, called an artificial wetlands wastewater treatment system or rock/plant filter onsite wastewater treatment system. Using Section 319 funds, the project has successfully demonstrated how this best management practice can be used for onsite wastewater disposal.

A Hollywood, SC, home site was selected for the project because of severe septic system failures and the homeowners' willingness to try an innovative solution. The home is located in a subdivision in southwestern Charleston County. A performance evaluation of South Carolina septic tank systems in 1987 identified homes in the development as having significant septic system problems. This is particularly due to the poorly drained soil with a shallow seasonal high water table.

The system is modeled on one developed by Dr. B.C. Wolverton, who designed a simple backyard system that purifies septic tank discharges. The rock/plant system consists of stones buried in a shallow ditch and plants rooted in the stones. Partially treated sewage from the septic tank flows through the stone filter, providing moisture and nutrients to the plants. Together, the plants and stone filter cleanse the septic tank discharge while adding beauty to the lawn. The only upkeep is harvesting some plants once or twice a year.

Water samples collected at both ends of the rock/plant filter demonstration project were analyzed for nitrate nitrogen, five-day biochemical oxygen demand (BOD5), total suspended solids (TSS), and fecal coliform bacteria. Preliminary results showed that the filter effectively removed bacteria and BOD5. Based on six samples collected between March and July 1992, the system removed 95 percent of the fecal coliform bacteria from the incoming wastewater. During the study, the bacteria level at the inlet measured 230,000 per 100 milliliters; on the same day, the bacteria level at the outlet was 80 bacteria per 100 milliliters--a treatment efficiency of 99.97 percent.

A second artificial wetland on a similar problem soil was constructed in Horry County and appears to be functioning properly. The success of those two systems has led state sanitation officials to consider artificial wetlands as appropriate solutions for emergency repair of malfunctioning septic tank systems.

Stevens Creek Watershed: Reducing Rural Road Runoff

In 1995, the Ninety Six District Resource Conservation and Development Council (RC&D) was awarded a Section 319 grant to implement demonstration BMPs to reduce sediment originating from unpaved public roads in the Stevens Creek Watershed. This watershed includes portions of four counties. The natural drainage of this area terminates at the Savannah River.

Within the Stevens Creek Watershed are hundreds of miles of unpaved roads that are generally maintained by county or state government. Many of these roads originally began as wagon trails with no consideration given to modern engineering design and construction techniques. Over the years these roads have become established as sole access routes for hundreds of landowners who depend upon them as vital transportation links. Local governments have inherited the problem of maintaining these roads which in many instances is made difficult because of the original "wagon-trail" method of installation and highly erosive soils. Original bridge, culvert and road ditch sizing is typically inadequate for frequent storm events and compounds maintenance problems for local governments' limited financial resources.

To date, several BMPs have been installed in the Stevens Creek Watershed by state and local agencies to control sediment runoff. Calcium chloride applications (a hygroscopic agent) were demonstrated to control dust and stabilize road beds. Runoff sediment results from dust being transported into road ditches and washed into natural water courses. Reduction in dust from this demonstration is most noticeable on roads where soils are derived from slate rock formations. Culvert demonstrations were installed at two sites. Culverts were designed to improve surface drainage and prevent storm runoff from moving across road surfaces. One county completed installation of gravel surfacing underlaid with geotextile to determine the effectiveness of geotextile fabric in gravel retention. Another county Public

Works Department purchased a hydroseeder for use in roadbank vegetation activities. Hydroseeding will complement structural improvements to unpaved public roads as the county Public Works Department performs routine maintenance activities.

Onsite Wastewater Concept Seminars
With financial help from a Section 319 grant, the SCDHEC Division of Onsite Wastewater Management presented a series of three-day Current Concepts Seminars in 1992 and 1993. The target audience was sanitarians at the county level. Topics were related to NPS impacts of onsite systems and included proper installation, maintenance, and innovative alternatives to standard septic systems.

NPS Education for Municipal Officials (NEMO)
As coastal communities in South Carolina become more populated, more development will occur. Development results in more impervious surface coverage, which consequently leads to more NPS contaminants being generated and delivered via stormwater runoff to local streams, waterways, groundwater, wells and potable water supplies. The NEMO program, originally developed by the University of Connecticut Cooperative Extension, is a three tiered informational, educational and technical assistance strategy for protecting local water quality by linking land use decisions with NPS pollution. This program is being adapted for use in South Carolina through a collaboration between the SC Sea Grant Extension Program, the Waccamaw Council of Governments (COG), and the Clemson Extension Service.

While public awareness campaigns have been somewhat successful in educating the general public about how their behavior affects NPS pollution, educating local officials on how land use policies impact water quality, and getting them to consider these effects, is a more complex challenge. The goal of NEMO is to inform and educate local officials on how local land use decisions and NPS pollution are inextricably linked, in an effort to have NPS pollution considered more when land use policy decisions are made. Unfortunately, most municipalities in South Carolina have yet to acknowledge the link between land use decisions and NPS pollution. By utilizing GIS technology, NEMO makes this link by demonstrating that an increase in impervious surface coverage, which is assumed to be an inescapable result of growth, results in an increase of NPS pollution. By using a zoning-based build-out analysis of impervious surface growth, NEMO projects possible future NPS problems in watersheds.

NEMO is a NPS focused program with educational and technical assistance that enables local planners and other decision makers to incorporate NPS concerns into their decision-making process. The program begins by introducing the basics of NPS pollution via a videotape. The program will emphasize the critical land use/NPS connection utilizing local GIS images and maps. Also, it will offer suggestions for local officials to consider when making land use decisions. When local planners see the effects their land use decisions have on water quality through colorful GIS-derived maps and slides, they will better understand the hidden impacts of NPS pollution locally. Identification of key contacts within the region and the development of an informal NEMO advisory committee, including members of local planning and zoning commissions, environmental groups, governing bodies and citizen organizations, will also be undertaken to encourage local input and further promote the local ownership of the NEMO program.

The NEMO program will show local officials in the watersheds that water quality cannot be treated as a stand-alone issue divorced from other local quality of life considerations such as urban sprawl, traffic, road maintenance, open space planning and the character of neighborhoods. NPS pollution should be an issue addressed in combination with these other issues. In this way, NEMO will serve as a catalyst for change by enabling local officials to better incorporate water resource protection into their everyday decisions.

Development & Implementation of a SC Coast-A-Syst

This project targets homeowners living along the Intracoastal Waterway and Socastee Creek (watershed 03040207-030) and the Intracoastal Waterway and Little River (watershed 03040206-140). Like much of the coast, these areas are experiencing rapid development and increased populations while also harboring fragile water resources for recreation and marine ecology. High fecal coliform bacteria counts, water quality non-supportive of aquatic life because of low dissolved oxygen, and pH excursions exist in local waterbodies.

To address these problems, the SC Sea Grant Consortium and Clemson University received Section 319 funds to develop and evaluate a program called South Carolina Coast-A-Syst. This product, modeled after the Home*A*Syst and Farm-A-Syst programs, will be used to teach watershed residents and waterbody users responsible practices for protecting water quality, with the ultimate goal to reduce bacteria and nutrient input into nearby waterbodies from urban/suburban activities and land development. Research will be conducted through surveys to determine what BMPs are appropriate for coastal SC, where education about NPS is lacking, and how best to reach homeowners in providing continued education. Education of coastal residents will include identification of practices which detrimentally affect water quality, reasons why those practices do so, and instructions in better water quality management practices.

This program is innovative in that it requires individuals to take responsibility for and to correct water quality impairments caused by their own activities. It is consistent with a national trend towards reducing environmental damage and reflects the national agenda of pollution prevention through better education. Sea Grant Extension and Clemson Extension will begin the program by mailing 1000 surveys to residents to evaluate current homeowner practices in the watershed.

Existing materials were developed through the Home*A*Syst program for Coast-A-Syst, looking at particular problems of the coast. Other materials to be utilized include: Farm-A-Syst manuals and computer templates available from the National Farm-A-Syst office; drafts of Home*A*Syst manuals from South Carolina and several other states; information on responsible practices for gardens and lawn care from other Sea Grant Agencies; and information specific to state regulations and NPS problems on the coast.

Sea Grant Extension and Clemson Extension are publishing a SC Coast-A-Syst packet, which will include self-assessments and fact sheets on homeowner practices. Sea Grant Extension will also train Extension agents, Master Gardeners and homeowner associations to administer this homestead self-assessment program, distribute the program and materials through homeowner associations and other public groups, provide support for the program through the Horry County Extension Service, and provide electronic distribution of the program via the world wide web.

The packets will be applicable to most coastal areas in South Carolina experiencing NPS impairments due to urban/suburban activities, land development, recreational practices or other homestead-based activities. The information will be produced in a three-ring binder format so as to allow for periodic revision or additional materials that address specific NPS problems. The binder will be highlighted by self-assessments that homeowners take to evaluate the risk of their practices on the watershed. Persons connected to the world wide web will be able to assess their own actions (confidentially) and get information on BMPs electronically. Follow-up surveys will be sent out to monitor the progress of education on NPS pollution and the effectiveness of the program.

Reducing Sediment from Urban Development
Implemented by Clemson University, this project demonstrated how to improve water quality from construction sites by incorporating site-specific information into design of sediment controls. Sites which require properly estimated eroded sediment sizes include construction activities such as land development, road building, or other situations where either a sediment pond or other sediment control measures are installed. Project cooperators located sites having soils commonly found in the Cupboard Creek/Lake Broadway (3060103-070) watersheds. These are typical of many piedmont watersheds across the Southeast in topography, soils, and previous land use. The area, consisting of 128, 810 acres, is listed as a priority watershed in the South Carolina Management Program because recreational and aquatic life uses are only partially supported.

Eroded particle size distributions were evaluated for exposed subsoils. Relatively little is known about erosion control from subsoils, but they do not react to rainfall as do top soils and have quite different sediment characteristics. The SC Stormwater Management and Sediment Reduction Act requires use of eroded size distributions, but no field data had previously been collected to show that the recommended method actually works. Such information was an output of the project. A computer controlled portable rainfall simulator was used to apply rainfall to the areas so that runoff occurred and sediment samples were collected from each treatment for comparison. For BMP effectiveness, the impact on sediment control efficiencies were compared with differing estimates of eroded size. The information also provided an opportunity to evaluate alternative methods of estimating eroded size distribution. These results and the relationships between topsoil or subsoil characteristics and erosion were shared at field days, presentations to engineers and regulators, and through publication.

Goose Creek Reservoir Restoration
This reservoir is located in Berkeley County, north of the city of Charleston. NPS pollution, as a result of increased development in the watershed, is impairing the lake's designated uses. Nuisance aquatic plant growth and fish kills, as a result of low dissolved oxygen, have occurred. Through a Section 319 grant, a group of cooperating agencies, led by the Berkeley County Soil and Water Conservation District, is conducting NPS educational programs and demonstrations. Included will be a "Lake Fair," an event that gets lake and watershed residents actively involved in improving the water quality of their lake.

Mill Creek Watershed Assessment
The foremost objective of this project, being conducted by the University of South Carolina, is to quantify relationships among rainfall, runoff, and pollutant transport in the Mill Creek watershed, near Columbia. The watershed is an urbanizing area located in the sandhills province of South Carolina. Sandhills streams are particularly sensitive to NPS runoff and are responsive to management practices aimed at controlling it. USC is examining spatial and temporal patterns of variability in suspended sediments, turbidity, coliform bacteria, and nutrients, with sampling occurring during rainfall events. Efforts are made to sample on the rising limb, peak discharge, and falling limb portions of each storm hydrograph. Data is currently being collected and analyzed.

Water Quality Improvements in the Socasstee Creek Watershed Through Community Education and BMP Implementation
Socastee Creek lies in an urbanizing watershed along South Carolina's coast. This project, managed by SCDHEC-OCRM, will involve Horry County government, the Grand Strand Water and Sewer Authority, the SC Sea Grant Consortium and a local property owners association. The phased strategy will collect baseline data, conduct stakeholder meetings to get input, and then develop a watershed restoration strategy.

Identification and Mitigation of NPS in Kingston Lake and Crabtree Creek Watersheds
A number of organizations, led by Coastal Carolina University, will conduct a comprehensive project in these adjacent watersheds. The milestones of the project include collection of urban runoff baseline data, construct a demonstration stormwater retention pond located in a residential development and evaluate its efficacy, and produce educational information materials about urban NPS for people in the watershed.

Implementation of a Home*A*Syst in Three watersheds
Clemson University Extension, along with county extension offices will implement three separate Home*A*Syst programs in three different watersheds, one in the northwest, one in the north central, and one in the eastern part of the state. These watersheds are in urban or urbanizing areas and are impacted by NPS pollution that can be controlled by homeowners.

Constructed Wetlands For Failing Septic Tanks
The East Piedmont Resource Conservation and Development Council will manage the construction of ten constructed wetlands systems to replace failing septic tank systems at homes in a watershed in Newberry County . Camping Creek is degraded due to fecal coliform bacteria and failing septic tanks are the suspected cause. A comprehensive technology transfer program will complement the project to educate citizens about their benefit of the BMP.

NPS Reduction to Improve and Protect Impaired Waters in the Lake Keowee Watershed
The Friends of Lake Keowee Society, a lake homeowners association, will manage this comprehensive watershed project for Lake Keowee, a large scenic lake in northwestern South Carolina. The project will address NPS impacts in the rapidly urbanizing watershed including failing septic tanks, marinas, lakeside homeowners, construction sites, and other sources. Components of the project include monitoring to collect baseline data, BMP construction and demonstration, and citizen education.

Scale Effects on Chemical Flux and Coliform Counts in the Enoree River Watershed
The upper Enoree River watershed lies in the Greenville, SC, metropolitan area and is impacted by urban runoff. This assessment, conducted by Furman University staff and students, will monitor the water quality in the watershed over a three-year period in order to determine NPS impacts on a spatial and temporal scale, land use patterns, and landscape configuration. Water quality data will be analyzed for correlations between concentrations and discharge, watershed size, and land use patterns. The project will also serve to educate the students about NPS pollution and its impacts.

Urban Watershed Protection and Enhancement Through Stewardship and Education
Clemson University will implement this project. The objective of this is to develop stewardship of urban and rural watersheds located in two major metropolitan areas of Western South Carolina. The strategy is to develop a grassroots movement in watersheds where none currently exists. Components include education of stakeholders through the presentation of an urban watershed conference titled “Practical Watershed Planning for Growing Watersheds”.

Urban Storm Water Retrofit Demonstration
One of the most difficult sources of NPS pollution to manage is the runoff from existing urban developments. This is particularly problematic in coastal areas where land is very expensive, topography is flat and low with high groundwater tables, and existing development is directly adjacent to sensitive coastal waters. New technologies are being developed to provide municipalities and developers with options for addressing existing drainage and water quality problems.

The redevelopment of the Charleston Naval Base and the location of the NOAA Coastal Services Center on the Base provide an opportunity to construct an innovative urban retrofit demonstration project. SCDHEC-OCRM is implementing a project to install a STORMTREAT system at the NOAA center to treat a 0.8 acre drainage basin, and to test the applicability of this technology in a southern coastal environment and provide South Carolina municipalities and developers with the opportunity to see first-hand how such technology performs.

STORMTREAT is an innovative new method of treating storm water and is ideally suited for an urban retrofit project. The system is designed to remove 90 percent of pollutants found in storm water runoff and has been found through monitoring to achieve this removal efficiency. A STORMTREAT System consists of a series of 9.5-foot diameter cylindrical holding tanks which connect to an existing catch basin on the site to be treated. The number of tanks in the series depends upon the size of the drainage area, the design storm, and detention prior to reaching the STORMTREAT System. The tanks are designed to collect the first flush of a storm. Within each tank are sedimentation chambers and filter screens. After exiting these chambers, storm water passes into a small constructed wetland for the second stage of treatment. Residence time in the structure is 5 to 10 days. STORMTREAT is effective in areas where the water table fluctuates with the tide, as is the case at the Navy Base. Maintenance of the system consists of sediment removal by pumping every 3 to 5 years.

vi. Five Year Action Plan for Urban Activities

The following five year action plan outlines the specific tasks to be accomplished as part of the Urban NPS program. These activities lead toward meeting long-term goals and ensure continuing compliance and implementation of BMPs to protect ground and surface waters from urban activities in South Carolina.

Table 7.6 Five-Year Action Strategy for Urban Activities

ACTION ITEM	LONG TERM GOAL REF.	*RESPONSIBLE AGENCY(s)*	*MILESTONE(s)*	*MECHANISM*
1. Implement programs so as to reduce NPS impacts from urban runoff related pollutants by 10 percent statewide over the next 5 years	# 2, 3, 4, 5, 6	SCDHEC, Clemson U, SCDOT (regulatory) Concerted effort by cooperating agencies.	Reductions averaging 2 percent per year between 1999 and 2003.	Implementation of existing and expanded urban related regulatory programs, expanded coverage of NPDES stormwater permits. Implementation of projects conducted in priority watersheds and statewide.
2. Implement urban runoff watershed projects according to the SC Watershed Action Strategy in highest priority watersheds to address water quality parameters of concern (see WRAS Strategy)	# 4, 5	Collective endeavor by cooperating agencies. SCDHEC lead agency for Sec. 319 funded projects	Implement projects in five watersheds identified in WRAS for FY 1999 and FY 2000. Implement projects in five watersheds to be determined by WRAS process in FY 2001 and FY 2002 Same for FY 2003 and 2004	Funded with financial assistance from Sec.319, potentially State Revolving Fund (SRF), NRCS, and state and local funding from local govts. Technical assistance from all cooperating agencies and producers.

ACTION ITEM	LONG TERM GOAL REF.	*RESPONSIBLE AGENCY(s)*	*MILESTONE(s)*	*MECHANISM*
3. Continue to implement non-structural provisions (regulatory) for statewide urban runoff control and stormwater management.	# 4, 6	SCDHEC Bureau of Water	Issue 225 permits per year between 1999 and 2003 for construction sites one acre and over statewide except coastal zone	SC Stormwater Mgt. & Sediment Reduction Act, NPDES permits
		SCDHEC Bureau of Water	Issue final NPDES stormwater permits for Greenville Co. And Richland Co. in 1999.Issue draft NPDES stormwater permits (MS4) for 60 small municipalities in 2001. Issue final permits by 2003.	Clean Water Act and NPDES regulations
		SCDHEC OCRM	Issue 1,000 to 1,200 permits per year between 1999 and 2003 for construction sites one acre and over in the 8 coastal counties	SC Stormwater Mgt. & Sediment Reduction Act, NPDES permits
4. Assist municipalities and county govts. in obtaining State Revolving Fund (SRF) low interest loans for stormwater mgt. practices, maintenance, and solutions	# 9, 17	SCDHEC Bureau of Water with cooperation and willingness of local govts.	1999-2003	State Revolving Fund monies
5. Develop a BMP manual to focus specifically on the construction industry and the toxic substances and wastes most commonly found at these sites.	# 6	SCDHEC OCRM	1999-2000	Distribution of the manual will occur through all appropriate channels, including workshops and possibly attachment to stormwater permits

d. Marinas and Recreational Boating

i. Introduction

Marinas are located at the water's edge. Consequently, minimal buffering exists and pollutants are often discharged directly into the waterway. Documented adverse environmental impacts associated with marinas include dissolved oxygen deficiencies and high concentrations of toxic metals in aquatic organisms. In addition, marina construction activities can lead to the physical destruction of sensitive ecosystems and bottom-dwelling aquatic communities.

Presently, there are more than 100 marinas in South Carolina, with 68 of them in the coastal zone. As of April 1999, there were 412,000 registered and/or titled boats statewide. In addition, our coast also

attracts heavy transient usage. This is due to numerous widely promoted fishing tournaments, charter operations, and through traffic on the Atlantic Intracoastal Waterway.

ii. Marina and Recreational Boating Regulatory Programs

Two regulatory agencies are responsible for permitting marinas in South Carolina: the U. S. Army Corps of Engineers (USACOE) and the South Carolina Department of Health and Environmental Control (SCDHEC). Within SCDHEC, the two offices which have marina permitting authority are the Office of Ocean and Coastal Resource Management (SCDHEC-OCRM) and the Office of Environmental Quality Control (SCDHEC-Bureau of Water).

SCDHEC OCRM issues critical area permits for marinas within the critical area of the coastal zone. SCDHEC Bureau of Water issues permits for marinas at all other locations within the state and issues Section 401 Water Quality Certifications for marinas statewide. Two other agencies, the U.S. Coast Guard and the SC Department of Natural Resources (SCDNR), are responsible for managing recreational boating activity. The existing programs implemented by these agencies fully meet the management measures recommended by EPA for managing potential NPS impacts from marinas and recreational boating.

SCDHEC staff usually perform an official inspection for every marina in the critical area (coastal waters, saltwater wetlands, and beaches) once a year. Official inspections are never less frequent than once every two years. Additionally, all major marinas in the critical area receive an unofficial walk through by SCDHEC staff about every 45 days.

SCDHEC permitting and certification programs for marinas outside of the critical area of the coastal zone address management measures in conformity with the ***Guidelines Specifying Management Measures for Coastal NPS Waters***. There are also enforceable policies and mechanisms to ensure implementation of the management measures. The primary mechanism for regulating marinas outside of the critical area of the coastal zone is through theWater Quality Certification Program pursuant to Section 401 of the federal Clean Water Act and the state navigable waters permit. Section 401 requires SCDHEC to evaluate whether or not a project requiring a federal permit and which discharges into state waters will cause a violation of state water quality standards. Overall review of marina construction and subsequent operation through both the certification and navigable waters program is to ensure that water quality standards in Regulation 61-68 are not violated and navigation is not impeded. Review criteria which apply to marina review, as well as all projects subject to these programs, are in Regulation 61 Water Quality Certification, and Regulation 19-450, Permits for Construction in Navigable Waters.

Review of marina permit applications takes into consideration all of the siting and design and marina and boat operation and maintenance management measures. For certain marina designs, the applicant performs water quality modeling to insure adequate flushing to maintain water quality standards. The applicant may be required as a condition of the certification and permit to perform water quality monitoring to demonstrate that water quality is not affected. If water quality violations are observed, the marina owner/operator must take measures necessary to improve water quality.

If the review determines that water quality certification can be issued, Section 401 of the federal Clean Water Act and Regulation 61-101 allow SCDHEC to place conditions on the certification to insure that water quality will be maintained and water quality standards will not be violated. Regulation 19-450 allows placement of conditions on navigable waters permits. Usual conditions for marinas are designation of specific areas for boat maintenance, placement of litter receptacles, posting signs that it is unlawful to discharge raw wastes into state waters, requirement for installation of a marine sanitation device pump-out and disposal system, and requirements for fuel storage and delivery systems including development of a spill prevention and clean-up plan. Also, if a marina has a repair facility, they may be required to obtain an NPDES permit for stormwater depending upon the marina's Standard Industrial Classification (SIC) code.

Water quality certification, although not enforceable in and of itself, becomes a part of the USACOE permit. All conditions of the certification are also conditions of the permit. It is then enforceable by the Corps. If non-compliance with a condition causes water quality standards violations, the state can take enforcement action pursuant to the Pollution Control Act. No new regulations or legislation are needed to implement the marina and recreational boating component of the NPS Management Program.

iii. Other Programs

Marina Task Force
An interagency task force which evaluates new projects including marinas meets on the first Thursday of every month, and provides an opportunity for potential permit applicants to present project plans in their early stages. The task force consists of representatives from SCDHEC, Department of Natural Resources, US Fish and Wildlife Services, US Army Corps of Engineers, US National Marine Fisheries Service, and EPA. First organized by SCDHEC OCRM as a method of reviewing marina applications, the interagency meeting is usually attended by staff from both state and federal resource agencies who would review any permit application. The interagency meetings deal with issues statewide. These meeting are informal and allow applicants to present plans to various reviewers who can then comment on any potential problems.

No Discharge Zones for Marine Toilets
Federal water quality standards allow effluent from marine toilets to be discharged into surface waters provided it has undergone treatment and disinfection. These same regulations allow states to designate certain waterbodies as "no discharge" to prohibit even treated sewage from boats. If EPA concurs that a lake is eligible for no discharge for marine toilets, SCDHEC will require that all boats with marine toilets will no longer be able to discharge into a lake. Instead, the boats will have to hold the sewage and pump-out at a marina.

Before a state can prohibit the discharge, it must demonstrate to EPA that adequate and accessible pump-out facilities are available. One large lake in the state, Lake Hartwell is already designated a no discharge zone (NDZ). SCDHEC will propose to designate four lakes- Lake Keowee, Lake Wylie, Lake Thurmond, and Lake Murray- and one coastal area- Broad Creek as NDZs. SCDHEC has petitioned EPA to do so.

iv. Management Measures

South Carolina utilizes a wide variety of best management practices (BMPs), suited to the state's geography and climate, to meet the goals of these measures. Descriptions of best management practices used to implement the management measures in South Carolina are found in *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (EPA, 1993). Other sources of BMPs may be used as appropriate. Implementation of the BMPs are mandatory through SCDHEC's regulatory program and comprehensive marina permitting program.

Marina Flushing Management Measure
The Marina Flushing Management Measure applies to new and expanding marinas. Maintaining water quality within a marina basin depends primarily on flushing as determined by water circulation within the basin. If a marina is not properly flushed, pollutants could concentrate to unacceptable levels in the water and/or sediments, resulting in impacts to biological resources. The degree of flushing necessary to maintain water quality in a marina should be balanced with safety, vessel protection and sedimentation.

Under R.30-12(E)(4)(d), critical area marinas proposed to be located on dead-end or deep canals, without adequate circulation or tidal flushing, are not permitted. In areas with poor water circulation, the depth of basins and access canals is limited to the depth of the receiving waterbody. Coastal Management Program policies dictate that outside the critical area, marinas which are proposed to be located on dead-end or deep canals without adequate circulation or tidal flushing will not be permitted unless it can be determined that water quality will not be adversely affected. Additionally, under R.61-101 a water quality certification is issued only if a proposed marina will not violate water quality standards. The requirements of this measure are met during the permit review by the SCDHEC.

Water Quality Assessment Management Measure
The Water Quality Assessment Management Measure applies to new and expanding marinas. Water quality assessments can be used to ensure that water quality standards supporting a designated use are not exceeded.

The following practices are currently implemented in South Carolina. Under R.30-12(E)(5)(c), in the critical area a water quality sampling program is required for a SCDHEC critical area permit. The minimum requirements mandate pre-construction sampling and an annual sediment analysis. The monitoring requirements are expanded as deemed necessary by SCDHEC staff. Outside the critical area, water quality monitoring is nearly always required under R.61-101 as a part of the §404 certification or an equivalent review.

Habitat Assessment Management Measure
The Habitat Assessment Management Measure applies to new and expanding marinas where site changes may impact wetlands, shellfish beds, or other important habitats. Coastal marinas are often located in estuaries, one of the most diverse of all habitats. Proper siting and design can reduce short-term impacts (habitat destruction during construction) and long-term impacts (water quality, sedimentation, circulation, wake energy) on the surrounding environment.

This measure is addressed by both the permitting and commenting agencies involved in the collective state agency review of a marina permit. Under R.30-12(E)(3) in the critical area, new marinas are not allowed in shellfish harvesting waters or Outstanding Resource Waters. In addition, proposed marinas which would require any significant excavation of wetlands are not permitted. Outside the critical area, the above practices are addressed by SCDHEC and the other agencies involved in the collective state agency review.

Shoreline Stabilization Management Measure
This measure applies to new and expanding marinas where site changes may result in shoreline erosion. Shoreline erosion and the resulting turbidity and shoaling can be mitigated through various vegetative and structural methods.

The following practices are currently implemented in South Carolina to address shoreline erosion. The

USACOE handles erosion problems on U.S. navigable water channels if the erosion interferes with navigation. Shoreline stabilization projects that commonly require a Section 401 Water Quality Certification are commonly associated with these projects. State navigable water permits and critical area permits (R.30-12(C)) are routinely issued to private property owners to address local erosion problems. All such projects must be constructed according to acceptable state and/or federal standards. Overall, shoreline and streamside erosion is not considered a significant NPS pollution problem in South Carolina. However, where it is a problem, programs are in place to address it.

Stormwater Runoff Management Measure
This measure applies to new and expanding marinas and to existing marinas for hull maintenance areas. The principal pollutants in runoff from marina parking areas and hull maintenance areas are suspended solids and organics (predominantly oil and grease). Toxic metals from boat hull scraping and sanding are part of, or tend to become associated with, the suspended solids. The proper design and operation of the marina hull maintenance area is a significant way to prevent the entry of toxic pollutants from marina property into surface water.

In the critical area, SCDHEC marina permits require that a stormwater management plan which addresses runoff from all parking and maintenance areas be approved by SCDHEC staff. Wet ponds, dry ponds, grassed swales infiltration systems, and hull maintenance areas are examples of the practices required. R.30-12 E.(6)(b)(ix) states that "boat repairs, paint scraping, boat painting and other activities that may result in a discharge of waste or pollutants into state waters are prohibited;" and therefore, in the critical area properly designed upland hull maintenance areas are required of new marinas (if hull maintenance will be conducted at the marina). Outside the critical area, stormwater management and hull maintenance areas are required of marinas through SCDHEC's coastal zone certification of other state and federal permits associated with the marina and through the Stormwater Management and Sediment Reduction permit (R.72-307). This permit is required for all new marinas throughout the coastal zone. State navigable waters permits and Section 401 Water Quality Certification have similar requirements.

Fueling Station Design Management Measure
This measure applies to new and expanding marinas where fueling stations are added or moved. Spillage during fueling is a source of petroleum hydrocarbons in marinas. Most petroleum-based fuels are lighter than water and thus float on the water's surface, allowing for their capture if petroleum containment equipment is used in a timely manner.

This measure is fully met within the SCDHEC's water quality certification review and the permitting review. The SCDHEC requires a spill prevention and clean-up plan as a condition of the Section 401 certification which is issued for any new marina proposing fueling facilities or for any existing marina which is adding or moving fueling facilities.

Sewage Facility Management Measure
This measure applies to new and expanding marinas in areas where adequate marine sewage collection facilities do not exist. A major factor in successfully preventing sewage discharge is providing "adequate and reasonably available" pump-out facilities.

Under R.30-12(E)(6)(b)(I) and (ii), adequate working pump-out facilities and restrooms are required of new and expanding marinas in the critical area. Outside the critical area in the coastal zone, pump-out facilities may be required if needed through SCDHEC Coastal Zone Consistency Certification or Water Quality Certification of other state and federal permits associated with the marina or through a state navigable waters permit.

In addition to the requirements for marine sewage collection at new and expanding marinas, SCDHEC is also encouraging existing marinas within the state that presently do not have marine pump-out facilities to obtain them. Utilizing a grant made available through the Clean Vessel Act of 1992, the U.S. Fish and Wildlife Service's Marina Pump-out Grant Program is enabling the SCDHEC to offer to those existing marinas without pump-out facilities a cost-sharing option to purchase such a system, as well as to develop an

Operations and Maintenance Manual for the facility.

Signage is provided that identifies that the pump-out facility is available, as well as inform all who come onto all docks, piers, and areas adjacent to the marina that it is against both state and federal laws to discharge any raw, untreated sewage from any type of watercraft into the waters of South Carolina. Finally, an informational brochure is available that indicates the location of all pump-out facilities in the coastal zone, as well as educate boaters and the general public at large on the importance of proper disposal of marine sewage.

Solid Waste Management Measure

This management measure applies to new and expanding marinas. Marinas generate a variety of solid waste through the activities that occur on marina property and at their piers. The potential exists for disposal of solid waste in surface waters or on shore areas where the material can wash into surface waters when disposal facilities are not available. Marina patrons and employees are more likely to properly dispose of solid waste if given adequate opportunity and disposal facilities.

In South Carolina, R.30-12(E)(6)(b)(vii) and viii) specifically address this measure. Refuse containers, which must be maintained daily, are required at all new and expanding marinas. Containers for toxic substances may not be placed over or near the water. In the coastal zone, the SCDHEC policies state that provision of facilities for the proper handling of petroleum products, sewage, litter, waste, and other refuse must be made in new marinas.

Fish Waste Management Measure

This measure applies to marinas where fish waste is determined to be a source of water pollution. Fish waste consists of discarded remains after fish cleaning. This waste can result in water quality problems at marinas with large numbers of fish landings or at marinas that have limited fish landings but poor flushing. Fish waste decomposes which requires oxygen. In sufficient quantity, disposal of fish waste can thus be a cause of dissolved oxygen depression as well as odor problems.

This measure is addressed during the permitting process. In the critical area the SCDHEC has authority to require designated fish cleaning areas via R-30-12(E)(4)(h). The Coastal Management Program document contains a similar stipulation for marinas outside the critical area. The state is not aware of any fish waste-related water quality problems at existing marinas. If, however, a water quality problem does arise, correction of the problem will be required of the marina owner. In the critical area SCDHEC may require rectification of the problem. The SCDHEC can require correction at permitted marinas. SCDHEC can also require correction of problems at any marina, permitted or unpermitted, in the state if the problem has caused a violation of the state water quality standards via the SC Pollution Control Act.

Liquid Material Management Measure

This measure applies to marinas where liquid materials used in the maintenance, repair, or operation of boats are stored. Entry of potentially harmful liquid materials into surface waters can be minimized through proper storage and disposal. Marina operators are responsible for the proper storage of liquid materials for sale and for final disposal of liquid wastes, such as waste fuel, used oil, spent solvents, and spent antifreeze.

Regulation 30-12(E)(4)(h) states that "project proposals shall include facilities for the proper handling of petroleum products … and other refuse with regard to the SCDHEC specifications." Outside the critical area SCDHEC policies are similar under the Coastal Management Program document. Marina water quality certifications are routinely conditioned to require that any lease agreement used to rent dock space shall include a statement prohibiting the discharge of oil and gas, paint, litter, debris, wastewater, or other deleterious substances into the waters of the marina. Through a marina permit or certification, SCDHEC will require appropriate disposal containers for liquid materials and signage to direct marina patrons to such containers. In the critical area, the marina permit may be conditioned to require appropriate measures to control storage, transfer, containment and disposal of liquid materials. Outside the critical area, SCDHEC certification of federal permits will require appropriate measures for liquid material control.

Petroleum Control Management Measure

This measure is met through a variety of practices and is applied to boats via controls on marinas at which boat fueling takes place. Fuel and oil are commonly released into surface waters during fueling operations through the fuel tank air vent, during bilge pumping, and from spills directly into surface waters and into boats during fueling. Oil and grease from the operation and maintenance of inboard engines are a source of petroleum in bilges.

The SCDHEC marina permit requires that absorbent pads be available at the marina for boat use and for removing incidental spills during fueling operations. Automatic shutoff nozzles are required at marina fuel pumps as a condition of the water quality certification. SCDHEC encourages the use of fuel/air separators and oil absorbing materials in bilges with an educational pamphlet which is to be funded by a Clean Vessel Act grant.

Boat Cleaning Management Measure

This measure applies to marinas at which boat topsides are cleaned and marinas at which hull scrubbing in the water has been shown to result in water or sediment quality problems. Marina employees and boat owners use a variety of boat cleaners, such as teak cleaners, fiberglass polishers, and detergents. Boats are frequently cleaned over the water or onshore adjacent to the water. This results in a high likelihood of the cleaning material entering the water. Boat bottom paint is released into marina waters when boat bottoms are cleaned in the water. The use and release of potentially harmful cleaners and bottom paints to marina and surface waters can be minimized through use of appropriate practices.

In South Carolina, if monitoring data indicate either water quality or sediment quality problems, remedial action can be required via the Pollution Control Act, the water quality certification, and the SCDHEC permit or Coastal Zone Consistency Certification. Also, SCDHEC has produced a pamphlet that discourages the use of harmful detergents and cleaning compounds.

Public Education Management Measure

This measure is implemented through the distribution of an educational pamphlet and through placement of signs to direct boaters to pump-outs. A pamphlet, which targets the state's coastal zone, is being authored by the SCDHEC and funded through the Clean Vessel Act. The pamphlet will provide information on marine pollution issues and encourage responsible boat operation and maintenance practices such as the use of fuel/air separators, oil absorbent materials in bilges, and phosphate-free detergents for boat cleaning. The pamphlet is distributed at marina ship stores, community docks, and marine repair facilities. Signs directing boaters to pump-out locations are placed at strategic locations

along South Carolina's coast.

Maintenance of Sewage Facilities Management Measure
This measure applies to marinas where marine sewage disposal facilities exist. In order to reduce the release of untreated sewage into marina and surface waters, sewage facilities should be maintained in an operational condition.

This measure is addressed in the critical area through the SCDHEC marina permitting regulations which require that marinas provide adequate working pump-out facilities. The regulations also require marina operators to allow DHEC staff to inspect their facilities. Outside the critical area SCDHEC policies require that facilities for the proper handling of sewage be provided. SCDHEC will assure proper functioning of pump-outs in this area through an expansion of SCDHEC's existing marina inspection program. SCDHEC-OCRM enforcement staff inspects all coastal zone marinas. Pump-outs are also required as a part of the water quality certification. Should an inspection reveal that a marina's pump-out is not operational, the water quality certification may be used as an additional lever to ensure that pump-out is maintained. The SCDHEC will also be actively promoting pumpout use and maintenance in the coastal zone upon funding of the Clean Vessel Act grant.

Boat Operation Management Measure
This measure is intended to be applied by states in non-marina surface waters where evidence indicates that boating activities are impacting shallow-water habitats. Boat operation can re-suspend bottom sediment resulting in the reintroduction of toxic substances into the water column and increasing turbidity.

In the critical area SCDHEC does not permit floating docks in creeks that are less than 20 feet wide. Consequently, the use of large boats in small, shallow creeks is indirectly discouraged. This practice aids in achieving the goals of this measure. The SCDNR has established no-wake zones in areas experiencing shoreline erosion from boat wakes. No further restrictions on boating traffic are necessary because there is no evidence that boating activity is negatively impacting shallow water habitats in the coastal zone.

v. Significant Results of Section 319 funded Projects

Pump-Don’t Dump
The Lake Murray Homeowners Association used a small Section 319 grant to place 75 advisory signs at all marinas and boat launch facilities on this large recreational lake in the central part of the state. The signs warn boaters that it is illegal to discharge untreated sewage into the lake.

vi. Five Year Action Plan For Marinas and Recreational Boating

The existing marina permitting program in South Carolina fully meets, and in many instances exceeds, the recommended management measures for this nonpoint pollution source. The management measures are implemented through cooperative state agency and federal review. SCDHEC educates the boating public and marina operators, particularly in the coastal zone, as to the potential negative impact their activities can have on the marine environment, through a grant under the Clean Vessel Act. No new regulations or legislation are required to meet Section 6217 of the Coastal Zone Act Reauthorization Amendments enforceable policy requirements with regard to marinas and recreational boating.

Table 7.7 Five Year Action Strategy for Marinas and Recreational Boating

ACTION ITEM	*LONG TERM GOAL REF.*	*1999*	*2000*	***2001***	*2002*	*2003*
Include all marinas in the coastal zone on unofficial walk-through (inspection) route.	# 2, 3, 4, 6	X	X	X	X	X
Require that boat hull maintenance use proper BMPs using NPDES Stormwater General Permitting and the PCA as the enforceable policies.	# 2, 3, 4, 6	X	X	X	X	X
Place signs to identify marinas with pump-out facilities.	# 2, 3, 4, 6	X	X	X	X	X
Provide brochure to educate boating public about responsible boating practices	# 2, 3, 4, 6	X	X	X	X	X
Continue the process leading toward designation of 4 lakes and one coastal area as No Discharge Zones	# 2, 3, 4, 6, 16	X	X			

e. Mining

i. Introduction

South Carolina's mineral production consists of non-fuel minerals that provide raw materials for construction products and a precious metal industry. Mineral production data reported to the U.S. Department of the Interior indicate that the mining industry in South Carolina produced $495 million of non-fuel mineral commodities in 1996. This represents an increase of 10.6 percent over 1995 production figures. Portland cement clays (kaolin and brick), sand and gravel, and crushed stone represented the majority of the total mineral value. South Carolina continued to rank twenty-seventh nationally in the value of non-fuel materials produced. At the end of FY 1997-1998, there were 495 mining operations in South Carolina affecting more than 19,000 acres. Presently there is one gold mining operation in South Carolina with active exploration continuing.

Surface mining has the potential to generate NPS (NPS) pollution at any and all phases of operation. These phases include mineral exploration, mine development extraction, transportation, mining and processing, product storage, waste disposal and reclamation. Since each mineral commodity occurs under a differing range of geologic, hydrologic, climatic, and surface conditions, each mine site is characterized by its own particular set of potential surface water and/or groundwater pollutants. NPS impacts related to mining activities generally include hydrologic modification, erosion and sedimentation, water quality deterioration, fish and wildlife disturbances, and public nuisances.

Activities associated with mining can result in changes in the hydrologic cycle of the local area. Removing vegetation and topsoil can cause an increase in surface runoff and subsequent decreases in infiltration to the groundwater system. Soil erosion also frequently results, and resulting sediment can move to the bottom of slopes, clogging streams and increasing flood damage over the floodplain. Stream diversion, which is sometimes necessary to recover minerals, can have a significant effect on water quality and quantity at downstream locations. Dredging operations may change a stream’s characteristics by increasing its ability to carry water and, thus, may cause increased drainage from wetland systems and increased water movement during flooding. Placement of fill or removal of minerals from wetlands can alter the hydrologic function of these resource areas significantly.

Erosion and sedimentation are by far the most common adverse effects mining has on the environment. These effects include water quality degradation from excessive sediment and potential for fluctuation in pH resulting from various soil (overburden) types. Areas in and around the active extraction pit are subject to extensive erosive action. Unpaved haul and access roads are vulnerable to erosion as well as areas cleared for preparation of plant sites or other mine site structures. Stockpiles of sod, waste fines, and other materials can be eroded easily due to steep slope angles and the presence of fine-grained materials. Outlets from drainage ditches and dewatering trenches are also subject to erosion due to the concentration and velocity of large water volumes. Erosion of soil either in place or from stockpiles presents a dual problem. Not only is there a potential for sediment problem, but the soil itself is being lost.

ii. Mining Program Description

The SC Mining Act (Title 48, Chapter 20, SC Code 1976, as amended) serves as part of an overall management plan for effective control of water pollution from permitted mining operations. Before mining permits are issued, provisions must be made to ensure there will be no significant or adverse water pollution impacts from NPS. However, control of NPS pollution from pre-law or abandoned mines poses a more difficult problem because of access restrictions, costs, and lack of regulatory controls.

The SC Department of Health and Environmental Control, Bureau of Land and Waste Management has primary regulatory responsibility. Within the Bureau, the Division of Mining and Solid Waste Permitting (Division) is responsible for administering and implementing the SC Mining Act and its associated regulations.

The Mining Act provides "That the usefulness, productivity, and scenic values of all lands and waters involved in mining within the state shall receive the greatest practical degree of protection and restoration," and "That from the effective date of the Act no mining shall be carried on in the state unless plans for such mining include reasonable provisions for protection of the surrounding environment and for reclamation of the area of land affected by mining. Enforcement of the Act is through approval of reclamation plans, issuance of mining permits, collection of reclamation bonds, regular inspection of mining operations, development of technical standards, and publishing of an informational manual."

The Mining Act serves as part of an overall management plan for NPS pollution from active mines. The Act states that "any operator desiring to engage in mining shall make a written application to the SCDHEC. The Application for a Mining Permit requires an operator to address protection of natural resources, including fish and wildlife, publicly owned facilities, stream beds and lakes, and to describe potential sources of NPS pollution such as pumping of groundwater, deposition of sediments, landslides, and acid water pollution. The basic objective of the Reclamation Plan is to establish on a continuing basis, a vegetative cover, soil stability, and water and safety conditions appropriate to the area.

Specific items to be addressed include: (1) methods to prevent or eliminate conditions which will be hazardous to animal or fish life in or adjacent to the affected area; (2) method of restoring or establishing stream channels and stream banks to a condition which will minimize erosion and sedimentation; (3) method for control of contaminants and disposal of refuse including tailings; (4) measures to prevent collection and retention of small pools of water which are likely to become noxious, odious, or foul; and (5) a time schedule of reclamation activities, particularly those relating to erosion control, which are keyed to the maps required by the regulations.

Once an operator has submitted a completed application to the SCDHEC, an extensive review process begins. Copies of the application are sent to the appropriate state and federal agencies for review and comment. At least one and perhaps several pre-permit inspections are conducted by the staff person assigned to the area plus the biologist and the reclamation specialist and/or the hydrologist where deemed necessary. The biologist conducts an environmental appraisal to determine the pre-mining conditions and to identify possible environmental impacts of the operation. Potential NPS pollution is identified and discussed with the

mine operator and appropriate state officials, and the application is modified to reflect any mitigation measures.

The Mining Act gives SCDHEC authority to apply additional terms and conditions to a permit "as may be deemed necessary by SCDHEC to assure that the operation will comply fully with the requirements of the Act." Violations of any such conditions are treated as violations of the Act. Site-specific concerns regarding NPS pollution are often addressed in this manner. The Rules and Regulations lists specific terms and conditions that may be incorporated into a permit relating to sediment and erosion control and protection of surface waters from dredging operations and dewatering measures. After the application package has been reviewed, public notice requirements met and the environmental appraisal performed, the application is either approved, approved with stated modifications, or disapproved. A permit may be disapproved if it is shown to potentially have significant adverse impacts on water quality.

In addition to the regulatory program for mining, Division staff provides technical assistance to mine owners and operators concerning the design and installation of BMPs during mining and reclamation. The staff has the expertise to provide site specific information including design and construction of sediment and erosion control structures, hydrologic monitoring and recharge devices, wildlife protection and habitat restoration, and various types of reclamation. SCDHEC works very closely with other State agencies not only during the permitting process, but also in the implementation of a site-specific management plan which controls surface water and groundwater NPS pollution. The U.S. Department of Agriculture Natural Resource Conservation Service (USDA-NRCS) provides technical assistance with a wide range of conservation practices to units of government, landowners, and land users. Many mining companies have long-range conservation plans on file with the local Soil and Water Conservation District, through which NRCS provides technical assistance.

The Bureau of Land and Waste Management coordinates activities associated with administration of the Mining Act with the South Carolina Mining Council. This is an independent body, created by the South Carolina Legislature, with members from state government, the mining industry, non-governmental conservation interests, and water and air resource management. The Council's responsibilities include advising the Division on mining-related issues and serving as the first line of appeal for any decision or determination made by the Division.

The Bureau of Land and Waste Management defers matters relating to the promulgation of state water quality standards to the SCDHEC, Bureau of Water. As part of a National Pollutant Discharge Elimination System (NPDES) application, a mine operator is required to develop and implement a BMP plan that controls runoff from the mine site. The permit requires that the permittee develop and implement the plan prior to mining and throughout the duration of the permit. When a mine closes operations, it must submit to SCDHEC a closure program for the mine's waste treatment facility.

In addition to providing technical assistance, the Division is involved in research to develop or refine technical standards. The Act specifically states that the SCDHEC may cooperate with any federal, state, or local government or agency of this or any other state, in mutual programs to improve the enforcement of the Act, including research. Studies conducted by the Division relating to NPS pollution include a re-vegetation study on deep sand mines and a contracted hydrologic investigation of sinkhole occurrence associated with the mining of limestone deposits. Information gained from research projects is distributed to mine operators as part of an overall goal of education. Representatives from the staff participate in seminars for mine operators to enhance knowledge of the Act and usage of BMPs. The Division has published several booklets including a handbook of recommended practices for mine operators. The staff conducts technical programs for radio, television, civic groups and schools to improve public awareness of mining.

iii. BMPs for Protecting Water Quality from Mining Activities

Because of the nature of surface mining, certain steps must be taken to remove and process the mineral resource. These activities can, to varying degrees, impact surface water and groundwater quality. These impacts can be addressed through pre-mining planning, implementation of a site-specific water management

program, and adequate post-mining reclamation. They are routinely included as a permit condition. BMPs are used in pre-mining planning to assist mining companies and mine operators in selecting the most effective means of controlling erosion and off-site sedimentation damage; preventing any condition that will have an unduly adverse effect on groundwater, surface water, wildlife, or fisheries; and achieving vegetative cover, soil stability, water and safety conditions appropriate to the area upon final reclamation. In addition, they provide design standards and practices for existing operations. BMPs are site-specific and are controlled in part by the pre- and post-mining land use(s). The selection of a particular practice, therefore, is based on the characteristics of an individual site and the potential for off-site impacts.

iv. Significant Results of Completed Section 319 Projects

Mine Site NPS Demonstration
This project demonstrated mine-site reclamation for stabilizing and reducing NPS pollution from old mine sites (mined previous to the SC Mining Act). Over 3,000 acres of pre-law mine land was inventoried in the state. A mine site adjacent to an active mine was chosen for the demonstration project to facilitate the availability of equipment. The site was at the Scott Mine of W. R. Grace and Company in Aiken County. The project was carried out in conjunction with the company. The project stabilized the site which was eroding severely and had offsite runoff and it served as a demonstration of BMPs that could be used on other sites. The project included a sediment/stormwater detention basis, grading and vegetative planting for steep slope stabilization, and channel construction for runoff management. Planning the project included site mapping, computerization of peak runoff discharge and volumes using computer modeling, and site soil analysis. These data were used to design the practices for the most effective performance. The SC Dept. of Natural Resources Land Resources and Conservation Districts Division coordinated the work and performed the analyses along with private engineers. DNR contracted with W. R. Grace and Company to prepare the site and install BMPs. As part of the project, a field day was held for mine land owners to encourage them to stabilize pre-law mine land to prevent NPS pollution runoff. The field day included a presentation on the planning, design and implementation of BMPs, and "before reclamation" photographs to show the accomplishments made.

Mining and Construction BMP Evaluation
The project constituted Phase 2 of the evaluation and demonstration of mining and construction BMPs by SCDNR LRCD and Clemson University. The project site was Vulcan Materials Company's Liberty Quarry in Pickens County where land was available that was typical of land disturbed for mining or construction in the Piedmont. Vulcan Materials Company provided the land and site preparation. The Clemson University Rainfall Simulator was used during October 1991 to retest various cover treatments
that were established for Phase 1 in Summer 1990 (straw mulch, hydromulch, straw mulch with asphalt tack, and straw mulch with hydromulch as tack). Runoff rates and rainfall applications were measured, and grab samples obtained to determine sediment concentrations in the runoff over time. Data showed that the type of surface treatment no longer had any significant effect on sediment concentration, whereas the data from tests conducted in November 1990 and May 1991 showed significant differences between straw and non-straw treatments.

The new treatments for Phase 2 of the project were jute mulch, coconut fiber mat, synthetic geotextile mulch and straw mulch. The intent of evaluating and demonstrating these materials was to better quantify the effectiveness of erosion and sediment control materials in order to develop laboratory procedures to provide a quicker, simpler method than available to estimate the field effectiveness of the materials, thus providing mining and construction personnel a tool for planning and designing their projects. The rainfall simulator aided in demonstrating the effectiveness of the practices, including a full day for mining and construction personnel. Computer image analysis was used to evaluate the open space in the various materials and predict the field effectiveness of them. The report, *Mine Site Evaluations of Soil Cover Material*, includes findings of the project.

Small Mine Operators Education and Technical Assistance
This project was designed to provide a base program for non-regulatory technical assistance concerning

BMPs to operators of small mines in South Carolina. It was implemented using onsite assistance educational materials, and direct training. A pamphlet titled ***Introduction to Mining Best Management Practices*** was produced. Pamphlets with information about the use of several mining related BMPs were also produced. Workshops for small mine operations were conducted.

v. Five Year Action Plan for Mining

Table 7.8 Five-year Action Strategy for Mining

ACTION ITEM	*LONG TERM GOAL REF.*	*1999*	*2000*	*2001*	*2002*	*2003*
1. Continue to implement the regulatory provisions of the SC Mining Act and Rules and Regulations as they relate to NPS management program. Draft specific language for Rules and Regulations to provide for more stringent authority in addressing NPS pollution.	# 3, 4, 6	X	X			
2. Seek funding for one additional staff person to provide technical assistance to mine operators in the use of BMPs to control conditions that may result in surface water or groundwater contamination.	# 3, 4, 6	X	X	X		
3. Revise the publication entitled *Conservation and Reclamation for Mined Lands, A Handbook of Recommended Practices for Mining Operators*. Refine these BMPs so that they are directed at improving water quality in addition to runoff control and groundwater impacts.	# 3, 4, 6		X	X		
4. Continue to develop new BMPs to improve water quality on sites where NPDES permits are not required.	# 2, 3, 6	X	X	X	X	X
5. Develop and publish a Mine Operator's guide to permitting, operation, and reclamation.	# 2, 3, 6	X	X	X		
6. Continue to coordinate educational programs related to mining and reclamation.	# 2, 3, 6	X	X			
7. Develop a monitoring plan to document the water quality impacts of abandoned mine lands and implement a management plan for remedial action.	# 2, 3, 6	X	X	X		
8. Employ education, technical assistance, and research and demonstration projects related to voluntary BMPs on abandoned mined lands. These programs should be directed toward encouraging active mining companies to reclaim these areas as part of an ongoing reclamation effort on a voluntary basis. Refine these programs so that they are directed toward NPS and water quality control.	# 2, 3, 6	X	X	X	X	X
9. Develop a monitoring plan to collect and evaluate data concerning mine drainage and its effect on water quality in specific watersheds.	# 2, 3, 6	X	X	X		

ACTION ITEM	*LONG TERM GOAL REF.*	*1999*	*2000*	*2001*	*2002*	*2003*
10. Participate in training sessions on the effects of different BMPs on reducing NPS pollution from active mining operations and/or reclaiming abandoned mined lands.	# 2, 3, 6	X	X	X	X	X

f. Hydrologic Modification

i. Introduction

Hydrologic modification (or hydromodification) is defined as stream channelization, channel modification, and dam construction. These activities can negatively impact water quality, destroy or modify in-stream habitat and increase streambank and shoreline erosion. The U.S. Environmental Protection Agency (EPA) has divided hydromodification into three categories: channelization and channel modification, dams, and streambank and shoreline erosion.

Management measures for these categories must attempt to control the addition of pollutants to surface waters, and should reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, and other alternatives. The management measures must also be economically achievable. Hydrologic modification activities in South Carolina are managed through several programs implemented by the SC Department of Health and Environmental Control (SCDHEC). These programs meet all the EPA recommended management measures for NPS pollution from hydromodification activities and are described in detail in the following Sections.

ii. Implementation of State Policy

State policy with regard to hydromodification is through the use of two regulatory tools: state permits and project certification. Both tools are implemented by SCDHEC and must be considered as a package for management of hydromodification activities.

Two state permits are involved in the implementation of management measures for hydromodification. The type of permit is dependent upon the location of the activity. A critical area permit is required for coastal waters, salt water wetlands, and beaches defined as critical areas. A navigable waters permit is required for the remainder of the state.

State regulations (R.30-10 *et.seq*.)govern the issuance of the critical area permit. As one of the ten general considerations for all projects, the extent to which the activity could cause erosion is evaluated in the impact assessment process. Specific policies mandate that drainage projects avoid the more productive wetland systems and ensure the discharge from such projects do not result in extensive alteration of wetlands or the quality of coastal waters. Drainage projects must follow the least damaging alignment, must provide a public benefit, and must be part of a SCDHEC OCRM approved drainage plan (R.30-12.K.(I)). Dredging for the establishment of new canals which involves permanent alteration of wetland habitats will be prohibited unless no feasible alternative exists. The regulations also establish erosion control measures for highland portions of constructed waterways that must be tied into wetlands.

The state permit for construction in navigable waters is required for any construction, alteration, dredging, filling, flow alteration, or other activity (including channelization and channel modification) when such activity takes place in state navigable waters (“any waters capable of floating rafts of lumber or timber") which are not critical areas. Although the state's primary intent through the navigable waters permit is the protection of public navigation rights and ownership of riparian lands below mean high water, the permit

provides for a comprehensive environmental review coordinated among state environmental review agencies.

The navigable waters permit also provides a direct avenue for implementation of state water quality standards and Coastal Zone Consistency Certification, of which the Coastal Management Program (CMP) has direct policies regarding the impacts of channelization. A permit cannot be issued which would violate State Water Quality Classification and Standards, endanger the public health or violate coastal zone consistency policies.

South Carolina has two environmental certification programs: Section 401 water quality certification and Coastal Zone Consistency Certification. Section 401 certification is applicable statewide; Coastal Zone Consistency Certification is applicable only in the eight-county coastal zone. Primarily implemented through certification of permits pursuant to Section 404 of the CWA, both certification programs provide strong tools for managing NPS pollution. The Section 404 permit is required for all activities taking place in federally navigable waters. Expansion of jurisdiction of the Section 404 permit in 1986 to "above the headwaters" and isolated wetlands, with subsequent modifications regarding the definition of fill and the use of mechanized equipment in wetlands, has resulted in a geographically comprehensive wetland program. All stream channelization projects require a Section 404 permit. This provides a direct opportunity for implementation of state coastal zone policies and state water quality standards.

The state Water Quality Certification Program provides a mechanism for ensuring that state water quality standards are imposed on hydromodification projects, as well as any other activity requiring federal permits. Section 401 Water Quality Certification is triggered by a federal permit involving "waters of the United States", Section 404 permits, U.S. Coast Guard permits, and Federal Energy Regulatory Commission (FERC) licenses constitute the majority of involved permits. The certification ensures that the project will be conducted in a manner which will not violate state water quality standards. The following conditions are routinely placed on all Section 401 Water Quality

Certifications:

- The applicant must implement BMPs during construction to minimize erosion and migration of sediments off-site. These practices may include use of mulches, hay bales, silt fences, or other devices capable of preventing erosion and migration of sediments. All disturbed land surfaces must be stabilized upon project completion.

- The applicant must comply with the approved County Erosion and Sediment Control and/or Stormwater Ordinances.

- All excavated materials must be hauled off-site or placed on high land and properly contained and permanently stabilized to prevent erosion.

- Upon completion of construction activities, all disturbed areas must be permanently stabilized with a vegetative cover. This may include sprigging, trees, shrubs, vines or ground cover.

Other Section 401 conditions are applied as required by the specific activity. Because of the potential water quality impacts associated with a single-purpose project (e.g., drainage), such projects generally do not receive a positive determination.

Coastal zone consistency certification for hydromodification is triggered by the existence of a federal permit, a direct federal action, and/or a state navigable waters permit. Basic coastal zone policy requires that permanent wetland and wetland habitat impacts be avoided by development projects, including channelization and stream modification, "unless no feasible alternative exists or an overriding public interest can be demonstrated" in which case all environmental impacts must be minimized. Coastal zone policy also requires the review of the project by the SC DNR and the U.S. Fish and Wildlife Service (USFWS) for impacts on habitat. Protection of stream and wetland habitat also serves the purpose of protecting stream channels from major hydromodification projects.

Implementation of state policy for dam construction is similar to control of other hydromodification projects in South Carolina, requiring the same state permits and certifications. These permits and certifications include a navigable waters permit, Section 401 Water Quality Certification, Coastal Zone Consistency Certification (in the coastal zone), and a Section 404 permit from the USACOE. In addition, dams require a state dam safety permit or a state stormwater management and sediment reduction permit. Except for those permits issued by the USACOE, all permits and certifications are issued by the SCDHEC.

iii. Management Measures

The following describes the South Carolina NPS program in relation to the management measures recommended by EPA. These measures are broad, goal oriented statements that reflect what experts agree to be the most effective, economically achievable means to address NPS of pollution. South Carolina utilizes a wide variety of management practices suited to the state's geography and climate to meet the goals of these measures. Descriptions of best management practices used to implement the management measures in South Carolina are found in ***Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*** (EPA, 1993). Other sources of BMPs may be used as appropriate. The programs and policies, and the management practices used in South Carolina to implement each of the measures are described below.

Management Measure for Physical and Chemical Characteristics of Surface Waters
This management measure applies to public and private channelization and channel modification activities in order to prevent the degradation of physical and chemical characteristics of surface waters from such activities. It applies to any proposed channelization or channel modification projects to evaluate potential changes in surface water characteristics, as well as to existing modified channels that can be targeted for

opportunities to improve the surface water characteristics necessary to support desired fish and wildlife. The purpose of this measure is to ensure that the planning process for new hydromodification projects addresses changes to physical and chemical characteristics of surface waters that may occur as a result of the proposed work. For existing projects, the purpose of this management measure is to ensure that the operation and maintenance program uses any opportunities available to improve the physical and chemical characteristics of the surface waters. The physical and chemical characteristics of surface waters that may be influenced by channelization and channel modification include sediment, turbidity, salinity, temperature, nutrients, dissolved oxygen, oxygen demand, and contaminants.

The potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters are evaluated using the previously referenced state programs and tools, with input from federal permitting and reviewing agencies. Modification, restrictions, and BMPs are imposed on all proposed activities in the planning and design phase through the use of pre-planning and pre-application meetings. Because channelization projects are often considered major projects, preliminary review usually takes place before a monthly interagency pre-application meeting, attended by all environmental permitting and reviewing agencies (SCDHEC, SCDNR, SC Department of Archives and History, USACOE, USFWS, U.S. National Marine Fisheries, and EPA). The state considers this process an effective tool in identifying problems early in the process and making the applicant aware of the options.

The only routine operation and maintenance program for channelization and channel modification in South Carolina are those associated with the dredging of federal channels. Such projects are routinely reviewed by state and federal environmental agencies and conditions are placed on the operation to protect and maintain water quality and wetland habitat when necessary.

Instream and Riparian Habitat Restoration Management Measure

Instream and riparian habitat restoration pertains to surface waters where channelization and channel modification have altered or have the potential to alter instream and riparian habitat. The management measure applies to proposed and existing channelization or channel modification projects to determine the impacts on habitat. The intent of the management measure is to correct or prevent detrimental habitat changes.

The potential effects of proposed channelization and channel modification on instream and riparian habitat are evaluated for all projects in accordance with the procedures, policies and laws identified previously. South Carolina does not have a directed program for riparian habitat restoration along previously channelized streams. However, management measures for instream and riparian habitat restoration are routinely incorporated into development plans (new subdivisions or commercial development) which require mitigation for wetland impacts. Generally, this is accomplished by removing remnant spoil banks with associated improvement to surface hydrology to restore pre-channelization conditions to adjacent areas. Such areas are often targeted during general reviews for potential mitigation areas.

Management Measure for Erosion and Sediment Control
The purpose of management measures for erosion and sediment control for dam construction is to prevent sediment from entering surface waters during construction or maintenance. Site runoff is considered the largest cause of sediment loss.

The same considerations given to channelization projects are also given to dam construction projects, and the same types of requirements are imposed. Through the Dam Safety Permit, dam construction projects must meet all state Stormwater and Sediment Control regulations, including chemical and other pollutant control. FERC licensed projects are exempt from the Dam Safety Act as are ponds and small dams for agriculture, fish, wildlife or recreational uses on private lands that are "of no danger to other life and property downstream." However, such projects are not necessarily exempt from the state navigable waters permit and USACOE permits, including Section 401 Water Quality Certification and state Coastal Zone Consistency Certification. Coastal zone and Water Quality Certification requirements limit the impact on wetlands and related vegetation, as well as impose requirements for erosion and sediment control.

Management Measure for Chemical and Pollutant Control for Dam Construction
The construction and maintenance of dams often involves the use of a variety of substances which can negatively impact surface waters, such as pesticides, petrochemicals, construction chemicals, fertilizers and others. The intent of this management measure is to prevent downstream contamination from these chemicals and other onsite generated pollutants, including solid and sanitary wastes and wastewater .

Management measures for chemical and pollutant control are implemented through the Clemson University Division of Regulatory and Public Services Program, Department of Pesticide Regulation; and the SCDHEC Division of Solid and Hazardous Waste. Under the SC Pesticide Control Act and the associated Rules and Regulations for the enforcement of the Act, the storage, sale, use, quality control and numerous other areas related to pesticides are regulated. Only licensed applicators may apply restricted-use pesticides. Violations of the regulations constitute grounds for denial, suspension or revocation of the license .

The SCDHEC Division of Solid and Hazardous Waste, via the South Carolina Solid Waste Policy Act of 1991 and the South Carolina Hazardous Waste Management Act also regulate disposal and discharge of solid and hazardous wastes. The toxic substances and other wastes used and generated at construction sites are thus regulated depending on how the material is classified. BMPs implemented as required by the State Stormwater Management and Sediment Reduction Act also serve to intercept and collect pollutants and nutrients carried by runoff.

Management Measure for Protection of Water Quality and Instream and Riparian Habitat
The operation of dams can have a detrimental affect on surface water quality and aquatic habitat, both within the reservoir and downstream of the releases. The intent of this management measure is to establish a mechanism to evaluate potential impacts of dam operation on surface water quality and instream and riparian habitat and to implement, where necessary, cost effective measures to alleviate or reduce identified impacts.

Maintenance of minimum instream flows and minimum dam releases for major dams are established by the FERC license, the state navigable waters permit, and the state Section 401 Water Quality Certification Program through a case-by-case review and analysis of downstream impacts on water quality and riparian habitat. This process also generally includes a USACOE permit and the ensuing review involved with that permit. SCDHEC ensures that state water quality standards are maintained

and the use is consistent with the designated stream classification. The USFWS and the SCDNR provide consultation on habitat impacts. Non-FERC licensed dams are also afforded the same level of review and include dams of any size which will impact state or federal navigable waters or wetlands.

Management Measure for Eroding Streambanks and Shorelines
Streambank and shoreline erosion can be an NPS pollution problem along certain stream segments. The degree of the problem is dependent upon the erosion rate which is dependent upon topography, soil types, soil stabilization and water velocity and volume. The basic solution is one of bank or shoreline stabilization. This management measure is intended to be applied to these eroding shorelines and streambanks that constitute an NPS pollution problem.

Construction activities taking place on streambanks and shorelines must conform to the requirements of the State Stormwater Management and Sediment Reduction Act and regulations. Erosion and sediment controls can also be mandated through Section 401 Water Quality Certification, Coastal Zone Consistency Certification, and the state navigable waters permit as previously discussed in this chapter.

Boat-wake induced erosion can be a problem in heavily used areas. State boating laws, administered by the SCDNR, are used to control the speed of boats on South Carolina waterways for safety and other reasons, including erosion reduction, where such problems exist. For example, no-wake zones were established in 1991 adjacent to several rapidly eroding historical sites on the Ashley River in Charleston and Dorchester Counties in an attempt to reduce erosion from boat wakes.

The USACOE handles erosion problems on U.S. navigable water channels if the erosion interferes with navigation through a Section 404 Permit and state certification (water quality and coastal zone consistency). State navigable water permits and critical area permits are routinely issued to private property owners to address local erosion problems. All such projects must be constructed according to acceptable state and/or federal standards. Overall, shoreline and streamside erosion is not considered a significant NPS pollution problem in coastal South Carolina. However, shoreline and streamside erosion can be a problem in certain areas of the Piedmont and Mountain regions of the state due to a number of site-specific variables: local relief, rainfall events, watershed controls, soil types and conditions, and streamside stabilization.

iv. Five-Year Action strategy

All referenced programs are fully enforceable under state and/or federal law. The state's Water Quality Certification and Coastal Zone Consistency Certification programs prevent the issuance of state and federal permits unless all requirements are met, and once the permits are issued, violations are considered a violation of the permit and are subject to all applicable laws and regulations. The direct permitting Programs all have civil penalties and many allow for criminal penalties for willful and intentional violations and fraudulent intent.

The state of South Carolina has management measures for hydrologic modification, to include channelization and channel modification, dam construction, and streambank and shoreline erosion. Current state policies, laws, regulations and programs fully implement the EPA recommended management measures and such management measures are currently in use and have been for the past five to ten years. Although dam construction and streambank erosion is not considered a serious NPS pollution problem in South Carolina, the management mechanisms are still in place to address any potential issues. The current level of management has been effective in controlling NPS pollution from hydrologic modification activities and no significant problems have been identified. Consequently, no

new activities or implementation strategy will be undertaken for hydromodification activities. The five-year Action Strategy is to continue to implement the Program in all areas of the state including the coastal zone.

g. Wetlands, Riparian Areas, and Vegetated Treatment Systems

i. Introduction

According to the U.S. Fish and Wildlife Service (USFWS), nearly half (47 percent or 48.9 million acres) of the wetlands in the conterminous United States are in the 10 states of the Southeast region (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee). These wetlands cover 16 percent of the region's area. In South Carolina, 23 percent of the land is covered by 4.5 million acres of wetlands. This acreage includes 418,000 of estuarine emergent wetlands; 3.6 million acres of palustrine forested wetlands; 369,000 acres of scrub/shrub wetlands; and 218,000 acres of palustrine emergent wetlands.

During the mid-1970's to the mid-1980's, SC lost an estimated 61,000 acres of wetlands, with the greatest change occurring in the palustrine forested wetland category. This overall loss of 1.3 percent was the second lowest in the region next to Georgia's 1.0 percent loss. Estimated net wetland losses in the remainder of the region ranged from 1.6 percent for Alabama to 24 percent for North Carolina.

Wetlands play a vital role in NPS pollution management as nature's way of cleansing our surface and groundwaters. By ensuring that wetlands exist and maintain their natural functions, we are investing in the most efficient, economical and extensive best management practices available. So effective is their pollutant abatement function that we now frequently look to the creation of man-made wetland systems to provide this natural purification.

ii. Program Description

South Carolina has an aggressive wetland protection program integrated into a variety of state laws and regulations. These laws and regulations are directly related to NPS programs in the coastal zone and interior of the state. These existing regulatory programs currently meet all management measures for sources of nonpoint pollution in coastal waters for wetlands, riparian areas, and vegetated treatment systems.

In South Carolina, there is no comprehensive program or single agency responsible for wetlands protection and regulation. The EPA and the U.S. Army Corps of Engineers are responsible for administering the federal program for regulating development in wetlands. The Corps implements the program with guidelines established by EPA. The Corps delineates wetlands and determines which wetlands fall under regulatory jurisdiction and require a federal permit for development.

The Wetlands Reserve Program, administered by the NRCS, is designed to restore and protect wetlands. Under the Wetlands Reserve Program, up to a million acres nationwide of eligible wetlands may be enrolled in easements between 1995 and 2000. This program is open to enrollment of both pasture land and cropland. Details about this program in South Carolina can be found in Section a, ii of this chapter.

At the state level, the primary focus of wetland regulation is the 401 Water Quality Certification. The state addresses physical and hydrological impacts on wetlands and water quality to protect existing uses and prevent degradation. The Department may waive, issue with conditions, or deny a 401 Water Quality Certification. Certification is denied if the activity will have permanent adverse effects on existing or designated uses. The federal 404 Permit from the Corps will not be issued without the associated state action of a Section 401 Water Quality Certification and a coastal zone consistency determination. Section 401 Certification considers whether the activity is water dependent, the intended purpose of the activity, and whether there are feasible alternatives to the activity. It also considers all potential water quality impacts associated with the project, both direct and indirect, over the life of the project, including impacts on existing and classified uses; physical, chemical, and biological impacts, including cumulative impacts; the

effect on circulation patterns and water movement; and the cumulative impacts of the proposed activity and reasonably foreseen similar activities of the applicant and others. To facilitate data entry, locating project sites, and project tracking, staff of the SCDHEC Water Quality Certification, Standards, and Wetlands Section have GIS capability installed on their desktop computers.

SCDHEC's Bureau of Water has produced ***A Brief Guide to Wetland Regulations in South Carolina***. This booklet, intended for the regulated community describes the various state and federal laws and regulations pertaining to wetlands and permits needed before wetlands are impacted.

SCDHEC OCRM involvement in the wetland permitting process is triggered if the proposed wetland alteration takes place in the coastal zone or the critical area. The Coastal Zone is the area represented by South Carolina's eight coastal counties, Horry, Georgetown, Charleston, Berkeley, Dorchester, Colleton, Beaufort, and Jasper. The Critical Area is the area seaward of the line marking the limit of salt-tolerant vegetation (i.e., coastal waters, tidelands, beaches, and primary ocean front sand dunes). Projects within the critical area are reviewed by OCRM, and if consistent with the Coastal Zone Management Program, are issued a critical area permit (CAP). If a project is outside of the critical area, but within the coastal zone, OCRM will review the project for consistency with the Coastal Zone Management Program. In general, OCRM will not approve a project proposal unless no feasible alternatives exist or an overriding public interest can be demonstrated and any substantial environmental impacts can be minimized.

iii. Management Measures

The following Sections describe the states program in relation to the management measures recommended by the U.S. Environmental Protection Agency. These measures are broad, goal oriented statements that reflect what experts agree to be the most effective, economically achievable means to address NPS pollution that effects wetlands. South Carolina utilizes a wide variety of BMPs suited to the state's geography and climate to meet the goals of these measures. Descriptions of best management practices used to implement the management measures in South Carolina are found in ***Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*** (EPA, 1993). Other sources of BMPs may be used as appropriate. The programs and policies, and the management practices used statewide to implement each of the measures are described below.

Protection of Wetlands and Riparian Areas

Protection of the cleansing function of wetlands and riparian areas is fundamental to their continued benefits. In the coastal zone of South Carolina, the foremost wetland protection program is the Coastal Zone Management Program, (CMP), which integrates wetland protection and NPS pollution control. This is accomplished through direct coastal zone permits in the critical area of the state and through a permit "piggyback" program in the remainder of the coastal zone. Throughout the remainder of the state, protection of wetlands is accomplished through Section 401 Water Quality Certification as applied through Section 404 permits.

State Rules and Regulations for Permitting in the Critical Area govern the issuance of the critical area permit. As one of the ten general considerations for all projects, the extent to which the activity could cause erosion is evaluated in the impact assessment process. The basic protection of tidal wetlands from filling and similar alteration is fundamental to state policy. The creation of commercial and residential lots strictly for private gain is not legitimate justification for the filling of wetlands. Permit applications for the filling of wetlands and submerged lands for these purposes shall be denied, except for erosion control or boat ramps. Specific policies direct drainage projects to avoid the more productive wetlands and ensure the discharge from such projects do not result in extensive alteration of wetlands or the quality of coastal waters. Drainage projects must follow the least damaging alignment, must provide a public benefit, and must be part of an approved drainage plan. Dredging for establishment of new canals which involves permanent alteration of wetland habitats will be prohibited unless no feasible alternative exists. The regulations also establish erosion control measures for highland portions of constructed waterways that must be tied into wetlands.

South Carolina's Coastal Management Plan (CMP) requires Coastal Zone Consistency Certification of all federal and state permits in the eight-county coastal zone, an area approximately 200 miles long and 40 to 50 miles inland. This consistency certification encompasses virtually all new development in the coastal zone. State Coastal Zone Consistency Certification for wetlands and riparian areas is implemented primarily through the United States Army Corps of Engineers, Section 404 permit. This permit is required for all activities taking place in "waters of the United States," which in SC includes state and federal navigable waters, waters and wetlands "above the headwaters" (5 cfs), and isolated wetlands. With recent modifications to Section 404 regarding the definition of fill and the use of mechanized equipment in wetlands, Section 404 has become a comprehensive wetland program with full geographic coverage. Because the state found the USACOE's Nationwide Permit #26 inconsistent with the CMP and the state Section 401 Water Quality Certification program, a Section 404 permit is required for alterations of any size in jurisdictional wetlands in the coastal zone and in wetlands greater than one-third acre in size throughout the remainder of the state.

The Coastal Zone Consistency Certification Program requires all development to meet a strict wetland policy. The policy, applied to all types of development, provides no permanent alteration of productive salt, brackish or freshwater wetlands unless there are no feasible alternatives or an overriding public interest can be demonstrated and environmental impacts can be minimized. The policies serve as performance standards, and specific policies apply to each of the following areas:

ACTIVIT	**ACTIVITY**	**ACTIVITY**
Airports	Railways	Parking Facilities
Agriculture	Forestry	Mineral Extraction
Manufacturing	Fish/Seafood Processing	Aquaculture
Commercial Development	Marinas	Boat Ramps
Docks and Piers	Wildlife Management	Artificial Reefs
Impoundments	Dredging	Spoil Disposal
Sewage Treatment	Solid Waste Disposal	Public Buildings
Dams and Reservoirs	Water Supply	Energy

Barrier Islands	Dune Areas	Navigation Channels
Public Open Spaces	Wetlands	Roads/Highways
Residential	Ports	

The coastal zone policy also requires NPS pollution controls on all new development requiring consistency certification. These controls have been governed by stormwater management guidelines since 1984 and more recently by the SC Stormwater Management and Sediment Reduction Act and its associated regulations. Coastal Zone Consistency Certification is not issued unless the project has met all sediment and erosion control requirements, and is inspected and certified by a professional engineer.

Taken collectively, the CMP not only protects the wetland and riparian systems and their associated water cleansing values, but also requires the development of NPS management systems to treat runoff and sediments prior to release into the wetland systems. The program does allow use of wetland systems for filtering and storage, but only after initial treatment of the runoff waters prior to entering the system and after ensuring the wetland system can meet storage and release requirements.

Throughout South Carolina, other state and federal programs operate to protect wetland systems and require NPS controls. South Carolina's Section 401 Water Quality Certification Program is similar to the CMP in that it examines the impact of development projects on wetland systems and their associated water quality functions. The Section 401 Water Quality Certification is a prerequisite to all USACOE Section 404 permits for alterations to wetlands. SCDHEC evaluates projects for compliance with state water quality standards. This includes maintaining existing and classified uses and the ecological integrity of all waters of the state, which includes wetlands.

The State Stormwater Management and Sediment Reduction Act requires NPS control measures for all development projects. These control measures cannot be developed within wetland areas, although the benefits of the wetland systems can be incorporated into the design of the stormwater management system.

Restoration of Wetland and Riparian Areas

In areas where the pollution abatement functions of wetlands and riparian areas have been damaged or destroyed, and these functions are needed to address NPS pollution problems, an effort should be made to restore these areas to their full function. This most often involves restoration of hydrology through control of surface drainage. Authority for restoration of wetland and riparian areas is identical to that described for the protection of wetlands and riparian areas. The state does not have a direct restoration program, but policies encouraging and directing such efforts are embodied within the CMP, Section 401 Water Quality Certification Program, and the Stormwater Management and Sediment Reduction Program.

Mitigation is a process designed to minimize or compensate for unavoidable wetland impacts when a permit is issued. The steps in the mitigation process should be observed by the applicant prior to any alteration of a wetland site is begun. The process consists of avoidance first, followed by minimization, and then compensation. Avoidance involves an evaluation of the project goals for necessity, water dependency, public benefit, and upland alternatives. Minimization involves the investigation of alternatives that will result in the least amount of wetland impact possible, while still achieving the project goal. Compensation involves an action to offset wetland impacts and can take on various forms; wetland restoration, wetland enhancement, wetland creation, upland buffers, or wetland preservation. Onsite compensation is preferred to off-site compensation, and the acreage of wetland impact must be
compensated for at least a one-to-one basis. In some instances, the applicant may have neither an onsite nor off-site compensation alternative. Depending on the circumstances, credits may be purchased from a mitigation bank. Mitigation is required by both the Corps of Engineers and the SCDHEC. Instructions for computing required mitigation is detailed in the Standard Operating Procedures document available from the Corps and SCDHEC. Compensation alternatives are often required to be protected forever by placing those wetlands in a deed restriction or conservation easement.

Policy fundamentals for the coastal zone are outlined in the CMP's guidelines for mitigation which stipulate that mitigation credit can be given for the restoration of impaired wetland systems. More recently, consideration has been given to the use of mitigation banks for certain project types, such as highway and utility corridor development. One focus of mitigation bank development is the identification and restoration of impaired wetlands. Opportunities to restore and/or enhance wetlands through management of wetland hydrology is a prime consideration.

No direct legislative authority exists for wetland mitigation/restoration outside of the coastal zone. However, the USACOE uses guidelines for establishing mitigation requirements and most projects having wetland impacts must mitigate, as directed through the Section 401 Water Quality Certification Program. Again, restoration of impaired wetlands is a preferred mitigation option.

Vegetated Treatment System
Vegetated filter strips and constructed wetlands, if properly designed, constructed and maintained, can effectively reduce NPS pollution. In the coastal zone, the vast majority of development projects which occur adjacent to wetlands are required by the CMP to buffer wetland systems in accordance with mitigation guidelines (CMP, III. C.3.XIV). These buffers are deed restricted to ensure their existence and regulate their use. Required buffer widths range from an average of 25 feet completely undisturbed buffer in single family residential developments to 75 or 100 feet for commercial and other highly intensive land uses.

Natural vegetative treatment systems have seen limited use in South Carolina not only for stormwater treatment but also for the treatment of wastewater. Success has been fair-to-good for stormwater treatment, but less so for the treatment of wastewater because of the impacts on the natural wetland system. Coastal zone policy encourages the use of created vegetative treatment systems for stormwater treatment. Success has been good for the treatment of runoff but mixed for the success of the created wetlands. Success appears to be directly related to the interest of the developer and the oversight by the regulatory agency. The first extensive use of a created vegetative/wetland treatment system for wastewater is currently in the design stage for an upcoming development project on Daniel Island, Berkeley County.

SCDHEC has recently developed a brochure that explains ways to encourage local governments to require riparian buffers in their planning. It will be printed during the summer of 1999.

iv. Significant Results of Completed Projects

Wetland Restoration in a Tributary to the Ashley River
The SCDHEC OCRM Charleston Harbor Project, using Section 319 funding, conducted a wetlands restoration project along a tributary to the Ashley River. In cooperation with Dorchester County, the Town of Summerville, and the US Army Corps of Engineers, a 9.5 acre wetland along Sawmill Branch Canal was selected for restoration. The area had been altered by the Corps in the 1960s to prevent flooding, and the spoils placed between the wetland and the canal. This isolated the wetland and caused

degradation of water quality in the wetland and canal. To remedy this problem, flow pipes were placed beneath the berm created by the spoil. This connected the wetland to the canal once again. Stormwater draining from nearby subdivisions now has an opportunity to be filtered through natural processes before entering Sawmill Branch Canal. The project produced an informative booklet, *Wetland Restoration: An Alternative Way to Treat NPS Pollution*.

Pocotaligo Swamp Restoration Project

Pocotaligo Swamp is located in Clarendon and Sumter Counties of South Carolina and encompasses over 30,000 acres of land. The watershed drainage basin area is approximately 490 square miles. Prior to 1950 the Pocotaligo Swamp was noted as a River-Swamp system with many well-defined flowing streams, dominated by a dense community of water tupelo and bald cypress trees. A great variety of wildlife species utilized the swamp. Clean deep streams were used for fishing and swimming. In the 1950's and early 1960's most of the trees were harvested from the swamp north of U.S. Highway 301. Clear-cut logging operations left access roads across the swamp which blocked stream channels and water flow within the swamp.

Water levels in the swamp increased which suppressed and prevented natural tree regeneration. This shallow, permanent flooding provided ideal conditions for aquatic weeds to grow. These aquatic weeds further reduced water flow and increased flood levels. Water levels remained 2 to 4 feet above the normal and natural elevations North of I-95. Within a few years Pocotaligo Swamp became a boggy mass of annual and perennial freshwater marsh plants that formed dense floating mats. Most of the weeds die back in the winter, and the onset of decay begins during the following summer. This decay process causes a significant increase in the biochemical oxygen demand and results in oxygen deficits that are lethal to many species of fish and aquatic life.

The objective of this project was to restore, on an experimental basis, the natural wetland environment in parts of the Pocotaligo Swamp Watershed. The initial goal of the project was to reestablish the natural water flow patterns within the swamp. This was accomplished by identifying, locating, and inventorying old stream channels and removing blockages.

In June 1995 a reconnaissance study was completed by the U.S. Army Corps of Engineers to determine the extent and range of degradation that has occurred within the Pocotaligo Swamp. This study identified problems associated with the Pocotaligo Swamp system and suggested potential solutions. In addition , a study was completed by Dr. James T. Morris, with the University of South Carolina, that focused on the impacts of the logging roads and nutrient loading within the swamp. According to these studies, the construction of over 35 logging roads in the 1950's obstructed the natural water flow of the swamp. Both reports emphasized the importance of removing these flow restrictions within the swamp.

In May of 1996 the present water flow channels in Pocotaligo Swamp were identified using aerial reconnaissance. With the assistance of South Carolina Department of Natural Resources, Water Resources Division, Wildlife Division, and Land Resources conservation Division, and the USDA Natural Resources Conservation Service, major stream channels were located and permanently marked with the global positioning system. The aerial study provided very useful information in assisting the ground teams in locating stream channels. The stream channel study revealed that excessive aquatic vegetation was obstructing water flow in many areas of the swamp. As stream channels are cleared of obstructions it is projected that the water velocity will increase and streams will become more defined as they erode to accommodate the increased flow. As the swamp restoration continues it is projected that only one or two major stream channels will carry the normal water flows.

In an effort to restore the natural tree canopy within the swamp, ten sites were selected for demonstration tree plantings. In 1995 three hundred and fifty, bare rooted, bald cypress (Taxodiun distichum) trees were planted in 1-3 feet of water and through thick aquatic vegetation. In January of 1996, an additional 238 root pruned bald cypress and 71 containerized water tupelo (Nyssa aquatica) were planted in additional areas.

Long term monitoring of these test plots along with additional planting will provide valuable information on restoration of other flooded freshwater wetland sites. Technical guidance and field assistance for these tree test plots was provided by Dr. William H. Conner, wetlands specialist with Clemson University. Dr. Conner plans to monitor tree growth and survival after the project is complete.

The South Carolina Department of Health and Environmental Control developed a water quality monitoring plan to determine the impact of blockage removal on water quality. In March of 1995 SCDHEC began monthly monitoring for dissolved oxygen and stream flow within Pocotaligo Swamp.
The second year of sampling ended in February 1997. Preliminary review of the data indicates that due to the breaching of the tram roads, and the spraying of the aquatic vegetation, flushing of the swamp has increased. With the increased flushing, DO levels on the average have increased throughout the swamp, along with decreased water levels. These factors should make conditions much more conducive for the replanting effort that is underway in selected areas of the swamp.

v. Five-Year Action strategy

All necessary management measures and enforceable mechanisms are in place to implement the program for wetlands disturbance activities statewide, including the coastal zone. The state's strategy for protection of wetlands is to continue to implement the regulatory program that is currently in place. No new actions are needed.

h. Land Disposal and Groundwater Protection

One of the primary goals of South Carolina's land disposal control activities is the protection of the states groundwater resources; hence, these two activities are discussed together. Land disposal activities are discussed first with a following sub-section for groundwater protection. There is overlap between these two sections especially as noted for the activities of the Groundwater Quality Section.

i. Land Disposal

Although modern solid waste disposal sites are considered point sources of pollution and regulated, leachate from sanitary landfills and dumps have the potential to pollute large portions of adjacent groundwater aquifers. Toxic compounds are commonly a part of the overall composition of landfill leachate, especially when the landfill has been used for the disposal of toxic chemicals.

There are currently 140 permitted landfills in South Carolina. This total represents 35 municipal solid waste landfills (MSWLF), 62 industrial waste landfills, 41 construction and demolition (C&D) landfills, one sludge monofill, and one ash monofill. The materials disposed in these facilities vary depending on the type of facility. MSWLF landfills accept municipal solid waste and industrial solid waste from manufacturing firms. Industrial Solid Waste Landfills are generally located onsite at manufacturing facilities and are permitted to accept waste streams specifically from the facility at which they are located. C&D landfills accept waste streams which are specifically outlined in the C&D regulation R.61-107.11. Sludge monofills and ash monofills are permitted respectively to accept sludge only and

ash only.

Wastewater sludge from both domestic and industrial sources is typically referred to as wastewater biosolids. Land application of biosolids may be beneficial and environmentally sound when applied at the correct agronomic rate. Land application is a form of recycling because it allows recovery of elements needed for crop production. Land applying biosolids can benefit farmers by offsetting the costs of fertilizer and lime while reducing the pressure on existing landfills. The best scientific evidence shows that properly treated biosolids can be applied to agricultural lands, lawns and forests with limited detrimental effects on water quality. To qualify for land application, biosolids must have been treated first to reduce pathogens, the potential to attract vectors, and meet standards for pollutants.

ii. Program Description

Landfills
Regulatory authority over solid waste disposal activities resides with the South Carolina Department of Health and Environmental Control (SCDHEC), Bureau of Land and Waste Management. The disposal of solid waste is regulated under the authority of the Solid Waste Policy and Management Act of 1991. SCDHEC has promulgated 16 regulations in the 1990's, and is currently preparing several more, as a result of requirements of the Solid Waste Policy and Management Act. The regulations recently promulgated by SCDHEC incorporate many of the previously utilized best management practices (BMPs) into regulatory format. Closure of solid waste landfills require BMPs to assure no runoff of NPS pollutants or seepage in to groundwater.

Brownfields
A Brownfields site is defined as an abandoned, idled or under-used industrial or commercial facility where the expansion or redevelopment is complicated by real or perceived environmental contamination. In some cases, runoff from contaminated sites to surface waterbodies, or contaminated groundwater discharge to surface waterbodies, may be of concern.

In 1995, South Carolina expanded its Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) based Voluntary Cleanup Program (VCP) to incorporate the United States Environmental Protection Agency's Brownfields Initiatives. As a result, the SCDHEC Bureau of Land and Waste Management now provides state CERCLA liability protection to Non-Responsible Parties (NRPs) purchasing contaminated sites in exchange for environmental assessment and/or remediation.

No current Brownfields inventory exists which estimates the number of sites in South Carolina. However, many towns, municipalities and counties in the state have reported that there are many sites not being developed or sold due to contamination or perceived contamination. The Bureau receives calls on a daily basis inquiring about the VCP from parties interested in remediating sites.

Since January 1996, the Bureau has entered into 12 contracts with NRPs to perform an assessment and/or remediation at Brownfields sites in South Carolina. The remedial efforts vary from minimal soil removal to vast amounts of soil removal along with groundwater pump and treat systems.

DHEC's remedial cleanup costs have ranged from approximately $40,000 to millions of dollars per site. Costs vary at each site depending upon the size of the site, quantity of contamination, and amount of personnel hours used to oversee site cleanup.

Land Application

The SCDHEC Bureau of Water regulates the land application of treated effluent and land application of sludge (wastewater biosolids) through its permitting programs. The most common method of land applying wastewater is by spray irrigation. The treated effluent is sprayed through nozzles and infiltrates and/or percolates into the ground at a disposal site. Most of the water evaporates into the atmosphere, and nutrients are taken up by plants growing on the site. SCDHEC staff applies the criteria described in the ***Land Treatment of Domestic Wastewater - Planning, Design and Monitoring Guidance for Slow-Rate Irrigation Projects*** **and** ***State Land Application Permitting: R.61-9.505*** when reviewing plans and developing permits for such projects. Also, for spray irrigation projects lying within the coastal zone, SCDHEC-OCRM reviews permit applications and may apply additional criteria as described in Coastal Management Program Refinements, Chapter III, C.3. XIII.

The application of solids, animal manures, biosolids, or sewage sludge is a permitted activity in South Carolina. Permitting authority resides within the Bureau of Water. The Bureau permitting staff currently apply the criteria described in SCDHEC'S ***State Industrial Sludge Management: R.61-9.504, State Domestic Sludge Management (R.61-9.503), Standards for the Use or Disposal of Sewage Sludge (40 CFR 257,403,503),*** **and** ***Standards for the Permitting of Agricultural Animal Facilities (R.61-43)*** when reviewing plans and developing permits for such projects. Working with experts from Clemson University, SCDHEC staff developed a guidance document for permitting, titled ***Beneficial Use of Wastewater Biosolids - Guidebook on Land Application of Wastewater Sludge.*** It is intended to guide applicants through the permitting process.

SCDHEC's Bureau of Water, Division of Water Monitoring, Assessment and Protection, Groundwater Quality Section conducts a program to prevent, monitor, and correct groundwater contamination from nonpoint source pollution from land application of wastewater biosolids, solids, animal manures, biosolids, and sewage sludge. The Section reviews groundwater data of existing sites and screens new sites for land application permits and re-issuances. Staff hydrogeologists perform hydrogeological feasibility reviews and provide comments to the permitting engineer regarding the suitability of the site for land application. All aquifers in the state are potential Underground Sources of Drinking Water and are protected under the SC Water Classifications and Standards. Groundwaters are thus protected in a manner consistent with SCDHEC groundwater protection strategy.

Staff hydrogeologists also implement a screening program for nonpoint source impacts from pits, ponds, and lagoons associated with the permitted storage, treatment, and disposal of industrial and municipal waste waters. These facilities are screened and an evaluation is made on the potential of groundwater impact from nonpoint source(s). Particular emphasis is placed on activities identified with greater potential for nonpoint source pollution impact to groundwater and are further investigated by means of site inspections. In some cases, requests will be made to facility owners to establish groundwater monitoring programs.

In cases where groundwater impact has been identified in violation of SC Water Classifications and Standards, appropriate actions will be coordinated with the facility owner to ensure regulatory compliance. The hydrogeologist coordinates with the facility owner to implement source identification, contaminant extent assessments, initiation of contaminant remediation systems and performance evaluations of corrective actions. In addition to releases from wastewater treatment systems, the Section evaluates releases from other nonpoint sources such as above ground tanks, non- regulated fuel oil tanks, spills and/or leaks. Sites with confirmed groundwater impact will be placed under a Consent Agreement or an Order.

These activities are implemented on a state-wide basis. To accomplish the goals of the activities, specific, expeditious milestones will be accomplished:

Milestone	Complete
Conduct a minimum of 10-15 groundwater evaluations during the twelve month project budget period. A summary report will be prepared at the end of this period and submitted to the EPA.	1999
Review a minimum of 150 groundwater data reports to ensure that groundwater quality is maintained during the 12 month budget period. A summary report will be prepared at the end of this period and submitted to the EPA.	1999
Review and screen a minimum of 5-10 agricultural land application sites	1999
Identify and evaluate 50 to 100 sites per year	1999
Inspect 15 to 30 sites per year	1999
Initiate 5 to 10 monitoring programs and review associated data, including review of future systems.	1999
Initiate 1 to 5 lagoon closures and review associated data	1999
Initiate 5 to 10 source identification/corrective actions, contaminant extent assessments, contaminant remediate systems where non-compliance is identified and review associated data.	1999

Recycling

Recycling solid waste reduces the amount of waste deposited in landfills and incinerators. As of June, 1996, 27 percent of the total waste (about 2.1 million tons) was recycled. DHEC's Office of Solid Waste Reduction and Recycling provides the state's recycling program. The Office was created by the S.C. Solid Waste Policy and Management Act of 1991. The Office is designed to provide educational, technical and grant assistance to local governments, schools, colleges and universities and the public regarding solid waste management issues in South Carolina. The Office is non-regulatory and cannot be involved in regulatory, compliance or enforcement issues of the agency.

A key effort of the Office has been the development and implementation of the "Recycle Guys" public awareness television and radio campaign. Introduced in 1997 to spread the word on recycling, the spots feature the Recycle Guys - animated characters who comprise the Office's logo. The Office also offers a Recycle Guys Awards Program, an annual program that honors the top solid waste management programs, projects and people in the state.

The Office serves as the hub of the S.C. Used Oil Partnership, developing one of the nation's top used oil recycling programs targeting do-it-yourself oil changers. NASCAR driver Jeff Gordon serves as the state's spokesperson on used oil recycling and is the center of the Office's public awareness campaign. In addition, the Office provides grant funding to local governments to set up used oil recycling centers. There are more than 600 used oil recycling centers statewide, including many sites that also take used oil filters and bottles. The partnership consists of the Office, the S.C. Petroleum Council, the S.C. Department of Transportation and Santee Cooper.

The Office also serves as the hub of the S.C. Partnership on Plastics Recycling, which has the goal to increase plastics recycling throughout the state. Members include the American Plastics Council, the National Association for PET Container Recycling, Wellman Inc., and the University of South Carolina's Center for Environmental Policy.

The Office has formed environmental education partnerships with several groups, organizations and companies, including the S.C. Soft Drink Association, the U.S. Postal Service, the S.C. Energy Office, the S.C. Army National Guard, International Paper and the National Kidney Foundation of South Carolina.

Funding for the Office comes from fees on lead-acid batteries, white goods, motor oil and tires. The funding is used for Office activities, including salaries, educational projects and materials, and grants to local governments, schools, colleges and universities.

The programs and projects work. The state's recycling rate has increased from 1.4 percent in fiscal year 1993 to 42 percent in fiscal year 1998. More than 4.2 million tons of materials were recycled the past fiscal year.

In addition, more than 800,000 gallons of used oil were collected in 1997 from do-it-yourself oil changers, and more than 3.6 million gallons of used oil since the program began. In addition, more than 96 tons of used oil filters and 49 tons of used oil bottles were collected for recycling in 1997.

iii. Best Management Practices for Land Disposal Activities

BMPs which have been incorporated into regulations include location restrictions (in relation to adjacent properties, wetlands, bodies of water, etc.), operation plans, runoff control, leachate management, and groundwater monitoring. The regulations require that all solid waste disposal facilities (landfills) obtain written authorization or a permit prior to commencing operation. The permits require the implementation of necessary BMPs.

Applications for permits typically require submission of comprehensive engineering reports addressing geological and hydrological conditions, siting criteria, proper facility design in accordance with specific regulations, operation criteria, closure procedures, and post-closure care (typically 30 years after closure). All permitted sites are closely monitored and inspected on a regular basis to ensure compliance with state regulations. Facilities which do not meet state standards are sent a compliance schedule to either correct deficiencies or close the site.

iv. Significant Results of Completed Projects

Guidelines for Land Application of Wastes and Technology Transfer of Information

The 319 grant program provided a logical means to finance technical assessment and technology transfer by expertise external to SCDHEC. Regional differences in soils and cropping systems affect agronomic rate, a critical parameter to determining sludge application and assimilation rates. Knowledge of soil processes and crop production systems in South Carolina is essential to the establishment of agronomic rate and sensible yet adequately protective and technically sound guidelines. Also, the project provided a linkage to County Agricultural Extension Agents who can stimulate adoption of land application by crop producers. Clemson University provided assistance to SCDHEC staff in gathering technical input and suggestions for improvement of their updated and expanded guidelines for land application of non-hazardous wastes such as sewage, septage and wastewater; they conducted of a series of technology transfer workshops with industrial and municipal waste managers and agricultural operators to review

draft and final Guidelines adopted by
DHEC; and they conducted a series of public information activities. A new guidance manual, the primary output, was published as a joint publication between DHEC and Clemson University in February 1996. This document received a first place award from EPA Region IV, the Public Acceptance category.

Case Studies of Waste Disposal Sites
Clemson University Department of Crop and Environmental Science examined soil quality at five sites across the state used for land application of various wastes to determine whether changes had occurred due to waste application. Types of sites included thaose where septage, domestic wastewater, and industrial wastewater are applied. Two golf courses were included. Comparisons were made between treated and untreated areas at each site. Surface soil was analyzed for total concentrations of 20 elements and Mehlich extractable concentrations of seven elements of agricultural significance. Also, soil profiles were examined for soluble salts, pH, and nitrate. The overall objectives were to determine if application rates were exceeding the capacity of the soil to assimilate waste constituents. Indices of deterioration of soil quality were excessive accumulation of metals, accumulation of sodium, soluble salts, or nitrate, and abnormally high or low soil pH.

No evidence of accumulation of any metals was found although in some cases concentration of one or two metals exceeded the maximum in a statewide database. In these instances, untreated areas at the site had equally high, if not higher, concentrations compared to treated areas. Mehlich extractable calcium, potassium, phosphorus, and other elements of agricultural significance tended to be greater for treated compared to untreated areas, but concentrations were not abnormally high compared to well-managed agricultural fields. Untreated areas usually were impoverished with regard to elements of agricultural significance. There was no evidence that soluble salts had accumulated in soil at any of the sites.

At only one site was there evidence that soil quality had been affected. In that instance, Mehlich extractable sodium accounted for over 20 percent of the exchangeable basic cations in the soil. Also, nitrate loading of the soil profile was considered excessive, exceeding 200 pounds per acre.

v. Five Year Action Plan for Land Disposal

Table 7.11 Five-Year Action Strategy for Land Disposal

ACTION ITEM	*LONG TERM GOAL REF.*	*1999*	*2000*	*2001*	*2002*	*2003*
1. Continue to enforce regulations to control NPS runoff and leachate from landfills.	#3, 4, 6	**X**	**X**	**X**	**X**	**X**
2. Monitor surface and groundwater for impacts of solid waste disposal sites.	**# 1**	**X**	**X**	**X**	**X**	**X**
3. Support the reduction and recycling recommendations of the Solid Waste Policy and Management Act of 1991.	**# 6**	**X**	**X**	**X**	**X**	X
4. Continue to identify non-point sources and evaluate the need for groundwater monitoring existing non-point source sites within each of the five basins.	**# 1, 10, 11**	**Broad River (Basin 5)**	**Savannah-Salkehatchie (Basin 1)**	**Saluda-Edisto (Basin 2)**	**Catawba-Santee (Basin 3)**	**Pee Dee (Basin 4**)
5. Continue to monitor groundwater quality data to prevent impact to groundwater from land application.	**#1, 11, 12**	**X**	**X**	**X**	**X**	**X**
6. Screen sites prior to approval of land application.	**# 11, 12**	**X**	**X**	**X**	**X**	**X**
7. Develop criteria for screening and monitoring of Agricultural Animal Facilities.	**# 9, 11, 12, 13**				**X**	**X**

ACTION ITEM	*LONG TERM GOAL REF.*	*1999*	*2000*	*2001*	*2002*	*2003*
8. Initiate groundwater assessments and corrective actions at land application sites where regulatory violations have been documented.	**# 11, 12, 13**	**X**	**X**	**X**	**X**	**X**
9. Re-evaluate dedicated land application sites to ensure compliance.	**# 11, 12, 13**	**X**	**X**	**X**	**X**	**X**
19. Seek candidate land fill and Brownfields projects for SRF loans	**# 9, 15**	**X**	**X**	**X**	**X**	**X**

vi. Groundwater Protection

All aquifers in the state are protected under the SC Water Classifications and Standards. The majority meet the definition of Class GB Groundwater Standards, thus are protected as potential sources of drinking water. Groundwater protection and assessment comprised of preventing and mitigating impacts to groundwater resources from both point and nonpoint sources. Several groundwater programs co-exist within the Agency, such as the State Underground Petroleum Response Bank Program, the Bureau of Land and Waste Management's Hydrogeology Division (groundwater activities associated with RCRA, CERCLA, landfills, state Superfund, and Brownfields programs) and the Bureau of Water's Division of Water Monitoring, Assessment and Protection (groundwater activities associated with the NPDES/ND Permitting, Non-regulated Hydrocarbon, Capacity Use, Source Water Protection, Public/Private Supply Well, UIC, and Groundwater 106 programs). Overall goals and strategies for groundwater quality protection as defined in the Comprehensive State Groundwater Program are implemented through the Groundwater Management Section, Division of Water Monitoring, Assessment and Protection, Bureau of Water, in conjunction with other groundwater programs. Discussions below are limited to the activities of the Division's two Sections as they pertain to the nonpoint Source Program.

The Groundwater Quality Section, Division of Water Monitoring, Assessment and Protection, Bureau of Water, conducts both the screening for groundwater quality concerns (as discussed above) and provides regulatory oversight for the assessment and corrective action of groundwater quality problems associated with non-regulated petroleum releases and wastewater treatment facilities. This Section coordinates with other program areas though direct interaction. This includes active participation with the Self-Directed Work Team that coordinates projects with the US Environmental Protection Agency CERCLA and SC Superfund programs. This Section also continues to promote interagency consistency of technical issues and policies regarding groundwater programs through the Groundwater Working Group. Additional activities include interaction with the Source Water Protection program for identification and follow-up of impacted water supply wells and surface waters contaminated from groundwater discharges.

vii. Program Description

Groundwater Assessment from Nonpoint Sources

In addition to the screening of new and existing sites for potential ground/surface water contamination from nonpoint sources such as land treatment/disposal sites and lagoons at animal, industrial, domestic, and municipal wastewater treatment facilities, the Groundwater Quality Section conducts a program to prevent, monitor, and correct groundwater contamination from nonpoint source pollution from wastewater treatment systems and all non-regulated petroleum releases. Existing sites, including nonpoint source impacts not regulated by the Resource Conservation Recovery Act (RCRA), the Comprehensive Environmental Response Compensation and Liability Act, or State Underground Petroleum Environmental Response Bank (SUPERB) are prioritized according to criteria protective of human health and the environment. These criteria focus the available resources for investigation, assessment, and corrective action at those sites located in the most vulnerable watershed areas, while maintaining groundwater quality standards throughout the state. Based on priority, the responsible party is required to determine the source, horizontal and vertical extent of contamination, and then design and implement an appropriate corrective action program. Source corrective action is always stressed as an initial measure to prevent additional impacts to groundwater resources. All existing projects and any new releases are placed under either a voluntary Consent Agreement or an Order to complete the necessary groundwater work.

Regional Groundwater Assessment

The greatest threat to groundwater quality, and especially to existing water supplies, occurs in those areas where water is recharged deeply downward from the ground surface. In those areas where it is recharged, groundwater and water supplies are vulnerable to NPS contamination or degraded water quality, even if the well locations conform to normal regulatory setbacks and isolation from point sources. Private homes usually have few options in well location. Knowledge of the degree to which existing and future water supplies are vulnerable to NPS contamination--on a regional, subregional, and local basis--is an early requirement in effective groundwater management. For instance, protection efforts such as sourcewater protection activities should be directed first and mainly to those areas where groundwater is hydrologically most easily contaminated, with less immediate attention needed for those areas where high isolation and natural protection exist.

An assessment currently underway by SCDHEC's Groundwater Management Section is applying to the Pee Dee basin (hereafter, the region) some investigatory principles and efficient methods of testing and evaluation that previously have been used successfully in broad surveys of other regions where suspected levels of groundwater vulnerability are linked to NPS contamination, including parts of the Piedmont and parts of the inner coastal plain sandhills. This assessment, however, is the first basin-wide effort.

The process of the Pee Dee basin assessment includes determining two main characteristics on a regional and sub-regional areal basis: 1) relative vulnerability to contamination of the shallowest principal aquifers, and 2) actual measurable impacts to groundwater supplies by contaminants (including those below regulatory thresholds). Emphasis is placed on nitrogen-bearing chemical species [nitrate, nitrite, ammonia, and dissolved organic nitrogen (TEN minus ammonia)] because these contaminants are widespread and important though occurring as trace contaminants, below the MCL, in community public system well water. Here the nitrogen species are used as inexpensively analyzed in-place tracers of recharge water coming from the ground surface or from the near-surface zone, i.e., from drain fields. These in-place chemicals are used as a surrogate index for innate vulnerability to more extreme contamination. Along with new sampling to be done for this survey, a review assessment will be made using existing data extracted from agency files on surface-derived contaminants at well-intake depths

(mainly as traces in public and private wells, but including acute contamination in abandoned wells).

The Pee Dee basin has several aspects giving rise to special concern. Several physical and cultural characteristics of the Pee Dee region suggest the possibility of greater problems with susceptibility. In this part of South Carolina, the major aquifer systems become much shallower, and presumably more vulnerable, as one proceeds eastward toward the North Carolina border. Despite this, the aquifers are very productive and there is widespread dependence and heavy use of groundwater for all purposes, including human consumption. Furthermore, this region long has had abundant and intensive cultivation of row crops, with attendant use of pesticides and fertilizers, and has long-established municipalities with their accompanying assemblages of potential contamination sources. Finally, there are initial suggestions for this region of both an increased aquifer vulnerability and the common input of nonpoint source nitrate. For these reasons, the region is being investigated at a sampling density sufficient to reveal principal sub-regions or geographic trends.

The proposed regional survey of the Pee Dee basin groundwater system primarily will use contaminant and isotopic evidence. SCDHEC previously has found these lines of evidence to be extremely efficient as a means to obtain vulnerability information for large areas, especially when compared to traditional methods for extracting hydrogeologic data (which are field intensive, involve much drilling and numerous pumping tests, and would be many times more expensive). Additionally, the proposed survey methods (using existing in-place geochemical and isotopic tracers) yield information that is more direct and less inferential than that from many other types of evidence.

Assessment of existing water supplies are the focus of the study. Also to be included are two principal land uses of special concern: urban and agricultural, each with a higher potential for contaminant presence. Agriculture is abundant in the region and many municipalities exist in geologic settings having a reasonably high probability of greater vulnerability. Several major public supply systems will be included in the sampling, thus providing some specific vulnerability information for these systems in addition to the wide-area survey. As a limited adjunct, effort will made to document the vulnerability of bored wells relative to the more common drilled wells under the geologic conditions of the Pee Dee region. Bacteria (fecal and nonfecal) will be a principal tracer used for this purpose. Small non-community public supply systems using wells will additionally be sampled for nitrate. Also included will be a limited investigation of likely sources of NPS nitrate (using nitrogen isotopes to attempt to discriminate fertilizer sources from organic sources, such as from septic tanks) and a number of shallow wells (of any type) at especially susceptible sites will be tested additionally for pesticides and non-nitrogen fertilizer constituents (phosphate, copper, zinc, plus components of obsolete pesticides: mercury, arsenic, lead, thallium). Both of these limited investigations are intended to reveal if more intensive investigations are warranted. Finally, in the data analysis one summary will involve water quality from the shallowest wells sampled (likely home wells) that will give some preliminary inference to the quality of groundwater that is delivered in baseflow to streams in inhabited areas.

Results of this investigation will provide data as to the extent and location of contaminants in groundwater, especially nitrates and fecal coliform bacteria from NPS impacts. This information will in turn lead to BMP implementation to remediate impacts. Expected completion date of the project is mid-2000.

viii. Five Year Action Plan for Groundwater Protection

Table 7.12 Five-Year Action Strategy for Groundwater Protection

ACTION ITEM	*LONG TERM GOAL REF.*	*1999*	*2000*	*2001*	*2002*	*2003*
1. Continue to initiate groundwater assessments and corrective actions at wastewater treatment facilities, non-regulated petroleum hydrocarbon and other miscellaneous sites where regulatory violations have been documented.	**# 6, 11, 12, 13**	**X**	**X**	**X**	**X**	**X**
2. Develop and implement a program to identify the source(s) for impacted public water supply wells.	**# 1, 11**	**X**	**X**	**X**	**X**	**X**
3. Continue to coordinate with other groundwater program areas to address all groundwater quality concerns.	**# 11, 14**	**X**	**X**	**X**	**X**	**X**

i. Other

i. Atmospheric Deposition

Windborn pollutants in the atmosphere can settle onto waterbodies. Precipitation may also contain pollutants. Sources may include geothermal emissions, fugitive dusts, and coal-fired plant emissions. Atmospheric deposition may contain such pollutants as mercury, volatile organic compounds, nitrogen oxide, and sulfur dioxide.

In South Carolina, fish from a number of rivers and lakes contain mercury at levels high enough to prompt human health warnings and consumption advisories. The source of the mercury contamination in fish is not clear. Naturally occurring mercury may be partially responsible for the levels found in fish tissue. Another source is deposition from the air, a result of the combustion of fossil fuels. There are no data available indicating mercury in wastewater discharges as a major source of mercury in fish in South Carolina. Naturally occurring low pH, low hardness, low alkalinity and low dissolved oxygen levels commonly found in the coastal plain swamps and blackwater streams promote the transformation of mercury into methyl mercury, the form most readily accumulated by fish.

South Carolina is not the only state where mercury is showing up in fish. More than 40 states are also seeing elevated mercury levels and have issued advisories. States are working together and with EPA to try to identify the cause or causes of mercury in fish.

A National Atmospheric Deposition Program (NADP) site for mercury sampling has been established in South Carolina for the last four years. It is one of many sites around the country. The site, in lower Richland County, is gathering data on mercury in precipitation. Samples of ambient air mercury levels are also gathered. Data gathered will help determine the source (s) of the deposition and severity. If additional funding is received, the sampling will continue. The site may be moved to a different location.

Table 7.13 Action Strategy of Atmospheric Deposition

ACTION ITEM	*LONG TERM GOAL REF.*	*RESPONSIBLE AGENCY(S)*	*MECHANISM*
1. Continue ambient mercury sampling through the NADP program for additional 5 years contingent upon future funding.	# 1	SCDHEC, EPA	Seek funding through EPA NADP for sampling and analysis.

CHAPTER 8
PROGRAM MANAGEMENT AND ADMINISTRATION

a. Description

South Carolina's NPS Program, including the financial management and implementation of Section 319 grants is handled efficiently and effectively within SCDHEC's Bureau of Water. The state takes full advantage of the capabilities of the Grant Reporting and Tracking System (GRTS) to track each grant/project period, from approval of projects through technical support and finally closeout. Section 319 funds are always expended properly and in a timely manner in order to complete projects, issuing grant agreements with cooperating agencies as soon as federal funds are awarded. Administrative costs are kept within ten percent of the Section 319 award. Grants are always closed out as soon as expiration occurs.

b. NPS Project Financial Management

The state uses the Administrative Information Management System (AIMS) to track federal and non-federal expenditures for the Section 319 grant program. Each Section 319 grant award is given a unique fund number. The agency's time and activity reporting system, known as PCAS (Personnel Cost Accountability System) is used to track the internal match. Quarterly financial reviews are conducted with the Administrative Management Section and the NPS Program staff. During these reviews, the state evaluates the active Section 319 grants. The NPS Grants Coordinator and the EQC Grants Coordinator work together to ensure that interim and final Financial Status Reports (FSRs) are completed in a timely manner.

c. Grants Tracking and Reporting System (GRTS)

South Carolina has made a major accomplishment by transitioning from the mainframe database reporting system to Lotus Notes. Lotus Notes is a windows-based system that is more user friendly and provides a means for implementing electronic grant reporting. US EPA Region 4 requested as of January 1998 that our state enter all GRTS data for Section 319 grants, including nationally mandated data elements and other project and task level data. For FY 98, Section 319 grants included a condition requiring data to be entered within 90 days of the grant award. SC updates project and task level information by April 30 and October 31 each year until the project closes.

d. Site Visits

The state performs site visits for each project. The NPS Coordinator and the NPS Grants Coordinator conduct at least one site visit during the grant project period. During the visit, the sub-recipient is encouraged to provide an oral presentation as well as a field tour. The lead agency and all cooperating agencies are invited to attend. Statewide, watershed, and assessment projects undergo a site visit. These visits serve as a valuable tool to ensure project compliance.

e. Project Compliance

The state has several steps to ensure project compliance. First, SCDHEC processes the sub-recipient request for payments on a reimbursement basis only, with 10 percent of the award held in reserve until the final closeout report is received. If status reports become delinquent, the NPS Grants Coordinator places a hold on the sub-recipient account until the reports are received. To satisfy OMB Circular A-133 requirements, the program area completes Quarterly Monitoring Reports. These reports verify that all sub-recipient projects are in compliance with federal guidelines.

To help Section 319 grant recipients in the grants reporting and compliance process, a ***Grants Reporting Guide*** has been developed. The handbook contains useful information such as reporting requirements and a sample status report form, site visit information, payment information, sample invoice, and project closeout guidelines.

f. Grant Condition Compliance

The state complies with all Section 319 grant terms and conditions including periodic and annual reporting, and maintenance of effort reporting. In keeping with Section 319, program administrative costs do not exceed ten percent of the grant award. Appropriate grant conditions are passed to contractors, through specific terms and conditions appearing in grant agreements.

g. Grants Closeout Procedure and Schedules

According to 40 CFR Section 31.50 which states that within 90 days after the expiration of the grant, the state must submit all financial, performance, and other reports required as a grant condition. The state has closed five grants and is scheduled to close three more by the end of year 2000. The NPS Grants Coordinator assists all grantees or subcontractors with closeout reports which are due 30 days after their grant agreement or contract terminates. These closeout reports are reviewed by the NPS Grants Coordinator to ensure that all milestones or tasks have been achieved. The grantee or subcontractor's financial reports are verified with the agency's audit system. The state has made great strides to close out projects and grants in a timely and efficient manner. Listed below is the schedule for Section 319 grant closure within South Carolina:

FY 90 Cooperative Agreement Number C 9004792-90Closed - September 30, 1996
FY 91 Cooperative Agreement Number C 9004941-91Closed - September 30, 1997
FY 92 Cooperative Agreement Number C 9004193-92
Closed - September 30, 1996
FY 93 Cooperative Agreement Number C 9994352-93 Closed - February 12, 1999
FY 94 Cooperative Agreement Number C 9994492-94 May 30, 2000
FY 95 Cooperative Agreement Number C 9994629-95
Closed - September 30, 1998
FY 96 Cooperative Agreement Number C 9994629-96
Closed September 30, 1999
FY 97 Cooperative Agreement Number C 9994629-97 September 30, 2000
FY 98 Cooperative Agreement Number C 9994629-98 September 30, 2003
FY 99 Cooperative Agreement Number C 9994629-99 September 30, 2005

CHAPTER 9
MONITORING, EVALUATION, AND TRACKING

a. Introduction

A system of evaluation/monitoring techniques is a necessary component of the NPS Management Program, in order to judge its progress and success. Evaluation will show whether the Program is attaining the state's overall water quality vision, stated long-term goals, and five-year action strategies. In South Carolina, several monitoring and tracking efforts will be employed that address available information on improvements in water quality, implementation milestones, and available information on reductions in NPS pollution.

b. Measuring Improvements in Water Quality

Statewide water quality monitoring and implementation of the Watershed Water Quality Management Strategy will allow limited monitoring information to address the broad questions regarding the effectiveness of implementation of the NPS Management Program. Water quality trends from various long-term monitoring programs are evaluated.

i. Watershed Water Quality Management Strategy

SCDHEC Bureau of Water's Watershed Water Quality Management Strategy (WWQMS) describes a water quality monitoring and watershed evaluation strategy program. It's objectives are to ensure that the water in South Carolina is safe for drinking and recreation, and that it is suitable to support and maintain aquatic flora and fauna. Functions include planning, permitting, compliance assurance, enforcement, and monitoring. For purposes of this program, the state is divided into eight major drainage basins: the Savannah, Salkehatchie, Saluda, Edisto, Broad, Catawba, Santee, and Pee Dee. Water quality monitoring, assessment, and implementation activities such as NPDES permitting, education, and planning are performed for each basin during a five-year cycle. The rotating schedule includes monitoring (year 1), water quality assessment and reporting (year 2), TMDL development and public workshops (year 3), permits issued (year 4), and continued remediation and implementation (year 5). When the cycle begins anew, data are evaluated and trends are noted.

To evaluate the state's water quality, SCDHEC's Bureau of Water operates a permanent statewide network of primary ambient monitoring stations and flexible, rotating secondary and watershed monitoring stations. The ambient monitoring network is directed toward determining long-term water quality trends, assessing attainment of water quality standards, identifying locations in need of additional attention, and providing background data for planning and evaluating stream classifications and standards. These standards and criteria define the instream chemical concentrations that provide for protection and reproduction of aquatic flora and fauna, determine support of the classified uses of each waterbody, and serve as instream limits for the regulation of wastewater discharges or other activities.

Some pollutants are common in NPS runoff, reaching waterways only after a heavy rainfall; therefore, in these situations, the best media for the detection of these chemicals are sediment and fish tissue where they may accumulate over time. Their impact may also affect the macroinvertebrate community. Regional ambient trend monitoring is conducted to collect data to indicate general biological conditions

of state waters which may be subject to a variety of point and NPS impacts. The Department uses ambient macroinvertebrate data to support the development of Watershed Water Quality Management Strategies. Ambient sampling is also used to establish regional reference or "least impacted" sites from which to make comparisons in future monitoring.

Additionally, special macroinvertebrate studies, in which stream specific comparisons among stations located upstream and downstream from a known discharge or NPS area, are used to assess impact. Qualitative sampling of macroinvertebrate communities are the primary bioassessment techniques used in ambient trend monitoring. A habitat assessment of general stream habitat availability and a substrate characterization is conducted at each site.

Under the WWQMS process, WWQMS reports are prepared for each of the five major river basins in South Carolina, Savannah-Salkehatchie, Saluda-Edisto, Catawba-Santee, Broad, and Pee Dee at the end of the 5-year cycle. The assessment (year 3) and evaluation (year 5) phases of the watershed process constitute a self-repeating feedback loop to review and assess the effectiveness of all relevant water resource programs. The Plans are prepared by SCDHEC Watershed Managers with input from a wide variety of stakeholders including federal, state and local government representatives, industry groups, environmental and citizen groups, and university researchers. The Plans are circulated for public review and are presented at public meetings in each river basin. The Plans are updated every five years based on follow-up water quality monitoring and other data.

ii. NPS Water Quality Monitoring

The SCDHEC Water Quality Monitoring Section and Aquatic Biology section are involved in a variety of monitoring projects, from one-time biological assessment sampling, to three year watershed surveys. Objectives include the identification of NPS problem areas; assessment of impacts on water quality, designated uses, and biological communities; and the evaluation of efforts to reduce or prevent NPS pollution. These projects are often cooperative interagency efforts for which these Sections answer some or all of the monitoring needs. Monitoring parameters include water chemistry, flow measurements, nutrient and bacteria levels, turbidity and suspended solids data, and macroinvertebrate community assessment.

In order to accomplish the goals of the NPS Management Program, in particular the Watershed Restoration Action Strategy (WRAS), a revised assessment and monitoring process and new NPS initiatives and strategies are now being developed and implemented. Water quality and bioassessment evaluations of NPS impacts are also conducted to assist in the design and implementation of reconnaissance activities. Results of reconnaissance activities are used to further screen impacted streams, rivers, and lakes and to identify specific pollution contributors and locations, leading to corrective action plans.

Information and data from these methodologies is published and made available through such sources as the *State Water Quality Assessment Pursuant to Section 305(b) of the Clean Water Act* [a.k.a. 305(b)Report], and *Priority-Ranked List of Waterbodies Targeted for Water Quality Management Action* [a.k.a. 303(d) List]. The 305(b) Report summarizes the state's water quality with respect to attainment of classified uses by comparing the ambient monitoring network data to the state Water Quality Standards. The 303(d) List identifies waterbodies not meeting State Water Quality Standards after application of required controls for point and NPS pollutants and identifies those requiring further assessment for controls. These reports provide the basis for tracking water quality related to NPS activities and indicate if the NPS program is meeting established goals. They also help to identify where additional resources

need to be focused.

c. Management Measure Tracking

Information from management measure tracking programs coupled with management measure effectiveness studies and with the long-term monitoring programs will be used to estimate pollutant load reduction and to assess water quality. They are an efficient way to track progress in meeting NPS Program goals and objectives. The following described forestry BMP tracking program and the planned agricultural BMP tracking program are examples of ways South Carolina will track management measures. SCDHEC OCRM will also track implementation of management measures through implementation of the Coastal Nonpoint Pollution Control Program.

i. Forestry BMP Tracking Program

The BMP program focuses on a proactive approach to preventing NPS pollution through the offer of courtesy logging site compliance inspections conducted by specially trained Forestry BMP Specialists. Forestry BMP Specialists work out of each of the SCFC's three regions. The courtesy exams provide forest landowners with site-specific BMP information that can be included in timber sale contracts. Approximately 200 harvested sites are evaluated for BMP compliance annually.

High priority watersheds are overflown on a regular basis to locate active harvesting activities. Courtesy exams are offered to the landowners after they are identified. Recommendations are made concerning appropriate BMPs including streamside management zones, road construction, stream crossing design, and site preparation techniques. Where damage has already occurred, recommendations for mitigating the damage are made. This program is publicized through local media throughout the state. If the landowner or logger does not comply with the recommendations, this information is given to SCDHEC and South Carolina timber buyers. These buyers will not purchase timber from those loggers. Further, SCDHEC may commence enforcement action based on the referral.

Evidence shows that BMP compliance is significantly higher on sites where the landowner has required compliance with BMPs in timber sale contracts. Tree harvesting BMPs have been evaluated for compliance on a statewide basis in comprehensive surveys three different times since 1989 when the program began. Compliance with harvesting BMPs was 84.5 percent in 1991, 84.7 percent in 1993, and 89.5 percent in 1994. Compliance with site preparation BMPs was 86.4 percent in 1996. A re-evaluation of both harvesting and site preparation BMP compliance is currently being conducted by the SCFC.

The SCFC plans to expand this tracking program, as resources are available, to ensure BMPs are monitored in a manner that will provide a scientifically and statistically valid evaluation of the statewide implementation of BMPs. The results of these surveys will continue to provide the information necessary to evaluate progress towards higher levels of compliance with the voluntary BMP implementation program on South Carolina’s forest lands.

In 1997, a new monitoring study was initiated to examine compliance with both harvesting and site preparation BMPs. This two-year study is designed to follow 200 harvested sites over a two-year period to examine compliance with harvesting and site preparation BMPs, as well as to determine the interval between the timber harvest and site preparation. Other issues that will be addressed include the period of time before site stabilization occurs, most desirable tree species for reforestation, and preferred methods

of site preparation.

ii. Agriculture BMP Tracking Program

The NPS Management Program intends to begin in FY 2000 an agriculture management measure tracking program similar to the one currently being implemented by the SC Forestry Commission. An agency is being sought through request for proposal, that will design and implement a statewide pilot agricultural BMP program. Goals of the project are to increase use of agricultural BMPs, restore impaired waters, develop a method to inventory and track BMPs, and develop strategies to increase the use of agriculture BMPs throughout the state to protect water quality from NPS pollution. The program would compare locations of existing Natural Resource Conservation Service (NRCS) Resource Conservation Plans with areas in the state where water quality impairments have been identified. It would then develop a strategy to correct, reduce, or prevent these NPS water quality impairment through technical assistance and education, and possibly incentives or sanctions. When an implementing agency is acquired, a tracking program would be designed and implementation would commence in FY 2000. Also SCDHEC will cooperate with NRCS to obtain data on producer compliance with and implementation of Resource Conservation Plans.

d. Evaluation Through the Watershed Restoration Action Strategy

SCDHEC and the NRCS worked together and with other state and federal stakeholders to complete a Unified Watershed Assessment for South Carolina and to select five watersheds as restoration priorities for FY 1999 and 2000. Comprehensive watershed restoration projects will be implemented in these priority watersheds for two years and then evaluated using the same process. At that time, the evaluation process will decide whether to continue in those watersheds, or move on to a new set of priorities. This process constitutes a self -repeating feedback loop to review and assess the effectiveness of the NPS Program.

A number of components will be used in making the evaluations. All projects and activities implemented in the watersheds will provide quantitative methods for evaluation of success. These can be tracked and evaluated so that changes can be made to projects, if necessary. Also, project plans contain quantitative interim milestones to meet final objectives. Attainment of milestones is reported to SCDHEC twice annually. Data is evaluated and entered into EPA's Grants Reporting Tracking System (GRTS). Information and data can be retrieved from the GRTS system in a fashion that allows for ease of evaluation and tracking.

SCDHEC monitoring staff provide water quality monitoring for assessment and evaluation of effectiveness of Section 319 watershed projects. For watershed projects that implement BMPs, effectiveness is evaluated through collection of instream data below implementation sites. Using the upstream-downstream assessment methodology, changes in water quality as a result of BMP implementation may be discerned.

e. Tracking and Evaluating through Feedback From Stakeholders

The state's agencies implementing the various categories and sub-categories of NPS pollution will evaluate their programs annually. Evaluations will be based upon a variety of factors that are listed in the Action Strategies for each category of NPS pollution. For example, the agriculture program will be evaluated based on trend analysis of long-term data collected at ambient water quality monitoring

stations; number and type of management measures implemented; analysis of project water quality monitoring when possible; and analysis of watershed monitoring through the WRAS. The state will also use surrogate measures of implementation rates to gauge progress. The state NPS Task Force will discuss these evaluations annually, and recommend program revisions as appropriate. The NPS Task Force will also meet annually to set priorities for the NPS Management Program for the upcoming year. The state and appropriate cooperating agencies will then work together to develop projects to meet those priorities. In addition, every two years the NPS Task Force will establish priority watersheds for the next two years under the Unified Watershed Assessment process and to evaluate the current program. New and revised information for the NPS Management Program will be prepared in response to these recommendations. Any revisions to the NPS Management Program will be circulated to the public for review and comment, and then submitted to EPA for approval.

The Watershed Water Quality Management Strategies are prepared by SCDHEC Bureau of Water Watershed Managers with input from a wide range of stakeholders including federal, state, and local government representatives, industry groups, environmental groups, and the interested public. Each of the Basin Plans are presented at workshops held in the river basins and feedback is requested and incorporated into the Plans.

f. Annual NPS Progress Report

The state reports annually to EPA on the progress in meeting NPS management program milestones, and provides information on reductions in NPS loadings and on improvements in water quality (or surrogate measures) resulting from program implementation. Information for the report is gathered from the above described programs and activities.

g. Five-year Action Strategy for Monitoring, Evaluation, and Tracking

Table 9.1 Action Strategy for Monitoring, Evaluation, and Tracking

ACTION ITEM	*LONG TERM GOAL REF.*	*RESPONSIBLE AGENCY(S)*	*MECHANISM*
1.Update each of the WWQMS documents based on self-repeating feedback loop to review and evaluate effectiveness. These are updated on a 5-year rotation schedule.	# 17	SCDHEC, cooperating agencies, and stakeholders	WWQMS strategy and process. Incorporate into NPS Management Program.
2.Based on new data and information, update 305(b) water quality assessment every 2 years and 303(d) list of NPS impacted waters annually	# 17	SCDHEC	Using these reports as a guide, update NPS Management Program
3. Implement agricultural and forestry BMP compliance programs. 1999 - 2003	# 2, 17	SCDHEC, Cooperating agencies	Using data and information generated from these programs, update the NPS Management Program
4. Utilize NPS Task Force to provide stakeholder feedback and evaluate program effectiveness and progress. 1999 - 2003 annually	# 17	SCDHEC, Task force member organizations	Using feedback and Task Force recommendations, update NPS Management Program
5. Evaluate milestones of NPS Management Program and prepare annual update. 1999 - 2003	# 17	SCDHEC	Annual report to EPA

APPENDIX A

EPA Guidance:
Process and Criteria for Funding State and Territorial Nonpoint Source Management Programs in FY 1999

Nonpoint Source Pollution Control Program
U.S. Environmental Protection Agency Office of Water

Process and Criteria for Funding State and Territorial Nonpoint Source Management Programs in FY 1999

[This guidance was signed on August 18, 1998]

MEMORANDUM

SUBJECT: Process and Criteria for Funding State and Territorial Nonpoint Source Management Programs in FY 1999

FROM: Robert H. Wayland III, Director Office of Wetlands, Oceans, and Watersheds

TO: EPA Regional Water Division Directors State and Interstate Water Quality Program Directors

The *Clean Water Action Plan,* released by the President in February 1998, presents a broad vision of watershed protection. A central aspect of the *Clean Water Action Plan* is its set of actions that are designed to promote a renewed focus by state, territorial, federal, tribal, and local governments and their stakeholders to (1) identify watersheds with the most critical water quality problems, and (2) work together to focus resources and implement effective strategies to solve these problems. To assist in implementing the *Clean Water Action Plan,* the President has requested that new federal resources be made available in FY 1999 and beyond and be targeted to support implementation of actions called for in Watershed Restoration Action Strategies.

The most significant resources to be provided under the Clean Water Act ("CWA") to assist in the implementation of Watershed Restoration Action Strategies will be made available under Section 319 of the CWA. While the precise dollar figure has not yet been decided upon by the Congress, I anticipate that the increase in Section 319 funds will be substantial. In anticipation of this funding increase, and consistent with the goals of the *Clean Water Action Plan,* this memorandum establishes guidance on the use of these incremental Section 319 funds.

Please note that, except as modified below, the *Nonpoint Source Program and Grants Guidance for Fiscal Years 1997 and Future Years,* issued by EPA in May 1996, remains in effect.

WATERSHED RESTORATION ACTION STRATEGIES

The *Clean Water Action Plan* provides that states and territories should work with other appropriate

agencies, governments, organizations, and the public to create Unified Watershed Assessments that identify watersheds that do not meet clean water and other natural resource goals and where preventive action is needed to sustain water quality and aquatic resources. As explained in June 9, 1998, guidance from James R. Lyons, Under Secretary for NaturalResources and Environment, U.S. Department of Agriculture, and Robert Perciasepe, Assistant Administrator, Office of Water, U.S. Environmental Protection Agency, entitled *Clean Water Action Plan . Unified Watershed Assessment Framework*, draft watershed assessments were scheduled for public comment by August 1, 1998, and final assessments are scheduled to be completed by October 1, 1998.

The *Clean Water Action Plan* next provides that states and territories should work with appropriate agencies, organizations, and the public to define watershed restoration priorities, with special attention to watersheds most in need of restoration and protection. This schedule must be coordinated with Section 303(d) of the Clean Water Act and provide an opportunity to bundle total maximum daily loads ("TMDLs") on a watershed scale. The schedule should identify the highest priority watersheds to be addressed in the first two years (through 2000). The *Unified Watershed Assessment Framework* provides that these watershed restoration priorities are to be defined by October 1, 1998.

The next step identified in the *Clean Water Action Plan* is for states and territories to work with public agencies and private-sector organizations and citizens to develop, based on the initial schedule for the first two years, Watershed Restoration Action Strategies, for watersheds most in need of restoration. At the end of the year 2000 and periodically thereafter, EPA and USDA, in consultation with other Federal and State agencies and the National Watershed Forum, will submit a Watershed Restoration Progress Report to the President, the nation's governors, tribal leaders, and the public, evaluating progress in implementing restoration actions and recommending any actions needed to improve progress toward meeting clean water goals.

GUIDELINES FOR INCREMENTAL SECTION 319 NONPOINT SOURCE GRANTS IN FY 1999

The following guidelines apply **to the award** and use of any Section 319 funds that are appropriated by the U.S. Congress in excess ofSlOO million (the amount that is identified in the *Clean Water Action Plan* as the base, above which the provisions of this guidance apply). In the discussion below, we refer to the funds exceeding $100 million as the "incremental Section 319 grant funds".

1. Allocation Formula: EPA will use the existing section 319 allocation formula (described in Appendix G of the May 1996 Nonpoint Source Program and Grants Guidance) to initially allocate any incremental Section 319 grant funds to states, territories, and tribes. These initial allocations may be modified as explained in the following paragraph.

2. Completion of Unified Watershed Assessments and Watershed Restoration Priorities: The incremental Section 319 grant funds are being provided to help states, territories, and their partners implement Watershed Restoration Action Strategies for watersheds identified in Unified Watershed Assessments. Therefore, incremental grant funds will be allocated only to states and territories that have completed their Unified Watershed Assessments and their Watershed Restoration Priorities by October 1, 1998, consistent with the *Unified WatershedAssessment Framework.* If any state or territory has failed to complete its Unified Watershed Assessment and Watershed Restoration Priorities by that date, EPA will distribute its allocation to all other states and territories that have completed their Unified Watershed Assessments and Watershed Restoration Priorities in accordance with the Section 319 allocation formula.

3. Use of Incremental Funding: Incremental Section 319 funds are subject to the same eligibility criteria and requirements as all other Section 319 funds. Thus states must meet for these funds the basic legal and program requirements that are set forth in Section 319 and in the May 1996 *Nonpoint Source Program and Grants Guidance* with regard to all Section 319 grants. For example, the 10% cap on administrative expenses contained in Section 319(h)(12) will apply to the entire amount of the Section 319 grant.

Within this existing framework, incremental funding under Section 319 will be focused upon implementing Watershed Restoration Action Strategies in areas identified by states and territories' Unified Watershed Assessments as being "in need of restoration. These areas, referred to as "Category1watersheds, are defined in the June 9, 1998 guidance, *Clean Water Action Plan .Unified Watershed Assessment Framework,* as those watersheds that "do not now meet, or face imminent threat of not meeting, clean water and other natural resource goals.' (Category I watersheds are described more completely in Appendix A to this memorandum. Watershed Restoration Action Strategies are described on pages 13 and 14 of the *Unified Watershed Assessment Framework.)* We recommend that the states emphasize restoration of the highest priority watersheds that the states have identified as needing to be addressed in FY 1999 and 2000.

4. Updating and Refining Nonpoint Source Programs and Assessments: I am revising the May **1996** nonpoint source program and grants guidance, which has previously allowed states and territories to use up to 20 percent of their Section 319 funds **or** $250,000, whichever is less, to upgrade and refine their nonpoint source programs and assessments. (See further discussion of the program upgrade process below under the heading, "Looking Towards FY 2000".) Beginning in FY 1999, states and territories are authorized to use up to 20 percent of their entire Section 319 allocation to upgrade and refine their nonpoint source programs and assessments, without any dollar limitation. States and territories may use these funds for any of the broad set of assessments and program development purposes outlined in detail on page 21 of the May 1996 guidance (which is reproduced in Appendix B), except that the incremental portion of this 20 percent (i.e., 20 percent of the appropriations that exceed the base allocation of $100 million) must be focused particularly on activities that will assist in the implementation of Watershed Restoration Action Strategies. A prominent example of such activities is the development of total maximum daily loads (TMDLs) to help implement a Watershed Restoration Action Strategy.

5. Schedule for FY 1999 Grant Applications and Awards

The schedule for states and territories to submit grant applications and for EPA to approve work plans and award grants for the base allocation of $100 million remains as set forth in Appendix D of the May 1996 Nonpoint Source Program and Grants Guidance. That guidance suggests that states and territories submit draft work plans by June 1; EPA provide response to work plans by July 8; states and territories submit final work plans and grant applications by August 1; and EPA approve work plans and award grants by October 1.

I recognize that the schedule described above is too ambitious to apply to the large increase in funds that are expected to be become available for FY 1999, particularly since the amount of the increase is likely to be determined in September 1998 at the earliest. Therefore, for the incremental funds in FY 1999, I am establishing the following schedule:

EPA provides funding targets which include reallocated funds	30 days after appropriation
States submit draft work plans to EPA Regions	January 16, 1999
EPA Regions provide response to work plans	February 13, 1999
States submit final work plans and grant applications to EPA Regions	March 13, 1999

The *Clean Water Action Plan* establishes an additional condition, beginning in FY 2000, for the award of the incremental Section 319 grant funds. This condition is based upon the May 1996 nonpoint source program and grants guidance which establishes a framework for States and Territories to upgrade their nonpoint source programs

to address nine key elements of successful nonpoint source programs. The key action in the *Clean Water Action Plan* states:

> "EPA and other Federal agencies will provide tecimical assistance to states and tribes to help upgrade polluted runoff programs to address all nine key program elements. Beginning in FY 1999, EPA and all states, territories, and tribes will expedite incorporation of the nine key elements established in national guidance into section 319 nonpoint source management programs. Also in FY 1999, EPA will advise states and tribes that, beginning in FY 2000, EPA will award any section 319 monies exceeding the $100 million authorized level only to those states and tribes that have incorporated all nine key elements into an approved section 319 nonpoint source management program."

On May 26, 1998, I sent to you a memorandum entitled "Process for Approval of Upgraded State and Territorial Nonpoint Source Management Programs", that provides guidance to assist the States in achieving the *Clean Water Action Plan* goal of upgrading the State nonpoint source programs by FY 2000. EPA is committed to working closely with the States to assure that they succeed in upgrading their programs and in subsequently receiving increased funds to implement these upgraded programs. To that end, we strongly encourage States to submit preliminary drafts of their upgraded programs to EPA so that EPA can provide early feedback and engage in constructive dialogue with the States prior to their formal submission of the programs.

2. Other Key Provisions in the Clean Water Action Plan

The increased Section 319 funding resources **to be made available in FY 1999** and beyond **provide an opportunity for States to implement** two **other** key actions of the *Clean Water Action Plan.* The first of these commits EPA and, in coastal States and Territories NOAA, to promote by the year 2000 the establishment of enforceable State authorities needed to ensure the implementation of nonpoint source controls to achieve water quality standards. The second commits EPA to work with the States to increase the number and dollar amount of loans made through state revolving loan fund (SRF) programs for priority projects to prevent polluted runoff, with the goal of increasing the annual percentage of funds loaned for this purpose to at least 10 percent by the year 2001.

I encourage States to apply their increased Section 319 funds, as part of their program development activities, to ongoing efforts to strengthen their nonpoint source management programs, both to improve and enhance their current enforceable authorities where needed to ensure implementation of controls to achieve water quality standards and to increase the use of SRF funds to support nonpoint source control efforts. Both stronger authorities and enhanced funding (including both increased Section 319 funds and SRF funds for nonpoint source control), used to implement upgraded State nonpoint source management programs, promise to provide the full range of tools needed to successfully solve our nation's remaining polluted runoff problems and achieve water quality standards.

TRIBAL PROGRAMS

Like their State counterparts, Tribes will share in the increased Section 319 funds made available in FY 1999 and beyond. As in the past, Tribes will continue to be awarded Section 319 grant funds in accordance with a separate national awards process. Therefore, the general processes, requirements, and deadlines outlined above for States and Territories will not be
applied to Tribes. EPA will continue to support and assist Tribes in their efforts to complete Unified Watershed Assessments and to develop and implement Watershed Restoration Action Strategies.

CONCLUSION

Polluted runoff is the greatest source of water quality problems in the United States today. The *Clean Water Action Plan* presents us all with exciting opportunities to focus our efforts and enhance our resources to solve these remaining water quality problems as well as to sustain good water quality. The application of increased funds to focus on solving our highest-priority problems, as described above, will enable us to make great strides in our efforts to achieve our water quality goals. I look forward to continuing to work closely with you in these endeavors.

If you have any questions concerning the implementation of the nonpoint source program and the *Clean Water Action Plan*, please call me at (202) 260-7166 or Geoff Grubbs, Director of the Assessment and Watershed Protection Division, at (202) 260-7040, or have your staff call Dov Weitman, Chief of the Nonpoint Source Control Branch, at (202)260-7088; FAX: (202) 260-7024; EMAIL: weitman.dov~epamail.epa.gov.

Attachments

cc: Roberta Savage, ASIWPCA cc: Tribal Leaders

APPENDIX A

CATEGORY I: WATERSHEDS IN NEED OF RESTORATION

Category I watersheds, as defined in the June **9, 1998,** USDA/USEPA **joint memorandum entitled, "Clean Water Action Plan** – *Unified Watershed Assessment Framework",* **are those watersheds that do not now meet, or face imminent threat of not meeting, clean water and other natural resource goals.** Selection factors include –

- **nonattainment of national clean water goals (including exceedances of state or tribal water quality standards, or impaired** drinking water sources, etc.);
- nonattainment of natural resource goals related to aquatic systems, including goals related to habitat, ecosystem health, and living resources;
- other appropriate measures and indicators of degraded aquatic system conditions (e.g., wetland condition and current and historical loss rates, percent impervious surface, and other measures of aquatic habitat);
- decline in the condition of living and natural resources that are part of the aquatic system in the watershed (e.g., decline in the populations of rare and endangered aquatic species, decline in healthy populations of fish and shellfish, etc.).

APPENDIX B
REVISING MANAGEMENT PROGRAMS AND ASSESSMENTS

(Excerpted from the May 1996 Nonpoint Source Program and Grants Guidance)

"States may use section 319 funds to update and refocus their State nonpoint source management programs and nonpoint sources assessments to improve program effectiveness. To assist States in these efforts, States may use up

to 20 percent of their section 3 19(h) funds or $250,000*, whichever is less, to update and refine their programs and assessments.

"In refining their programs to reflect the most pressing needs and highest-priority water quality problems in the State, States may need to carry out additional activities and analyses. Based on the key elements of State programs that are described in the preceding section of this guidance, program revisions that may be supported with section 319 grants include:
establishing appropriate indicators and milestones to gauge program progress; developing total maximum daily loads and other watershed-scale strategies to reduce nonpoint source pollution; focusing on determination of the most effective measures and practices to abate or prevent nonpoint pollution; strengthening links with Federal land management agencies; developing enhanced processes to involve public, private, and Federal partners in the design and implementation of State nonpoint source management programs; and instituting systems to assess program effectiveness and make appropriate revisions.

“In addition, states may need to carry out a number of activities that have generally been associated with nonpoint source assessments. For example, State may require additional assessment work either as part of specific watershed projects, or as part **or an overall** Statewide, regional, or ecoregional effort. Such additional assessment work will enable States to more clearly identify and prioritize their nonpoint source problems, evaluate the effectiveness of their nonpoint source management programs, and measure progress toward environmental goals.”

*This $250,000 limitation has been eliminated in this guidance.

APPENDIX B

South Carolina
Section 319 Grants Guidance
(click here to view the guidance information) PDF 3. 5MB

APPENDIX C

MINIMUM REQUIREMENTS FOR SEC. 319 PROJECT MONITORING PLAN WITH QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality Assurance Project Plan Contents

QA project plans coupled with SOPs define specific project QA/QC requirements. This approach identifies the parameters to be measured and discusses the QA activities to be conducted during sampling, analysis, and data validation stages of the project. The QA project plans must contain the following elements:

1.Title Page
A.Project name
B.Project requested by
C.Date of request
D.Date of project initiation
E. Project Officer (signature required)
F.Quality Assurance Officer or designee (signature required)
2.Project Description
3.Schedule of tasks and products
4.Project organization and responsibility
5.Data quality requirements and assessments (replicate and spiked samples). Includes analytical method requirements (federal reference, equivalent, and alternate test procedures)
6.Sampling procedures
A.Specific sampling site selection
B.Probes, collection devices, storage containers, and sample additives such as preservatives

C.
Special precautions, such as holding times and protection from heat, light, reactivity, and combustibility.
7.
Sample custody procedures
8.
Instrument selection includes calibration procedures, preventive, and remedial maintenance
9.Safety
10.Documentation, data reduction and reporting
11.Data validation
12.Performance and systems audits
13.Corrective action
14.Reports

The goal of this Quality Assurance Management Plan is to have an approved QA project plan prior to data collection. Until this Plan can be fully implemented, non-routine monitoring efforts (with the exception of situations involving immediate public health threats or criminal investigations) shall attempt to have an approved

QA project plan prior to data collection. For routine work, an immediate public health threat, or criminal investigation, a generic document (SOPs) outlining acceptable methods for sampling and analysis will suffice.

All of the State's QA project plans must be approved by the SQAMO or designee prior to data collection. The SQAMO or designee shall review all plans, provide input, recommend changes, and approve final plans. Upon request, technical staff shall peer review plans with regard to their area of expertise. QA activities are to be tracked by the Program's Project Officer.

Standard Operating Procedures (SOPs)

SOPs are composited into a document that describes how methods (EPA, Standard Methods, etc.) are to be routinely implemented. An SOP for sampling should contain sampling design and methodology, general site selection, sampling equipment and cleaning requirements, and safety issues. An analysis SOP generally contains such information as scope and application, method summary, safety procedures, interferences, sampling and storage, apparatus and materials, reagents and solvents, sample preparation and instrumental analysis protocols, calculations, analytical performance control requirements and documentation, and data reduction.The manual containing SOPs for analytical methodology must include the following general information:

- **tables of organization.**
- **chain of custody procedures and a description of forms.**
- **types of sample containers to be used, preservation required, summary of holding times, and cleaning and preparation of containers.**
- **types of parameters requiring field or trip blanks.**
- **field notebooks, workbooks or paperwork used internally for tracking sample analysis.**
- **data control recording notes.**
- **significant figures.**
- **reporting requirements for analytical results.**
- **lower limits of detection.**
- **sample and data management which includes form design, filing and storage.**
- **laboratory services, instrumentation, and equipment which involves laboratory pure water, preventative maintenance in the lab and record keeping.**
- **glassware types, uses, and cleaning protocol.**

- **grades and quality of reagents, solvents, fuels, and compressed gases.**

- **analytical procedures for each method used. Procedures must include data reduction and validation criteria to minimize data transcription and interpretation errors.**

- **list of attachments included in the document.**

The objectives of SOPs are:

- **to establish traceability of standards, reference materials, instrumentation, samples and environmental data.**

- **to train a user, with basic education and experience to properly use them.**

- **to establish consistency with sound scientific/engineering principles.**

- **to establish consistency with EPA regulations and guidelines.**

- **to establish consistency with the instrument manufacturer's specific instruction manuals.**

SOPs are to be prepared specific to the project needs. SOPs are to be reviewed by appropriate senior staff in the user organization, the QA staff, and by technical specialists in the specific work area. They are dynamic documents requiring revisions as determined by regulation, changes in equipment or protocol.

APPENDIX D

SCDHEC Staff Attorney's Opinion Concerning Enforcement of NPS Program

D H F C

E PROTECT PROSPER

2600 BullStreet
Columbia, SC 29201-1708

Commissioner

Douglas E. Bryant

Board
Bradford W. Wyche
Chairman
William M. Hull,Jr.,MD
Vice Chainnan
Roger Leaks, Jr.
Secretary
Mark B. Kent

Cyndi C. Mosteller

Brian K. Smith

Rodney L. Grandy

LEGAL MEMORANDUM

Date: April 27, 1999

To: Debra Hernandez, Assistant Planning Director
From: Kelly D. H. Lowry, Staff Counsel

Re: Enforcement of NPS program

You have requested a legal opinion regarding the authority of the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management (the Department) to enforce the non-point source provisions of Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990, 16 U.S.C. 1455b, P.L. 101-508. Alter due consideration, it is my opinion that the Department has the authority to enforce the non-point source provisions of Section 6217. This authority is found in the Pollution Control Act (PCA), S.C. Code Ann. § 48-1-10 et seq. (1987 & Supp. 1998), the myriad regulations promulgated thereunder, and the South Carolina Coastal Zone Management Act of 1977, codified as Tidelands and Wetlands, S.C. Code Ann. § 48-39-10 etseq. (Supp. 1998).

The PCA provides the Department with broad authority to abate pollution from all sources. To wit, Section 48-1-90 provides "[i]t shall be unlawful for any person, directly or indirectly, to throw, drain, run, allow to seep or otherwise discharge into the

environment *of* the State organic or inorganic matter, including sewage, industrial wastes and other wastes, except as in compliance with a permit issued by the Department." The Department may issue administrative orders and institute legal proceedings, including proceedings for injunctive relief, to enforce this prohibition. S.C. Code Ann. § 48-1-50(3), (4); S.C. Code Ann. § 48-39-50(I). The remedy requested in an action to enjoin such violations would include incorporation of any management measures as necessary, and would seek restoration of the environment to the *status quo ante* where appropriate. S.C. Code Ann. § 48-39-160. Furthermore, any person violating this prohibition is subject to civil and I or criminal penalties. S.C. Code Ann. § 48-1-320 and 330; S.C. Code Ann. § 48-39-170.

In addition to the general statutory authority provided in the PCA, the Department has promulgated regulations to cover many potential sources of non-point source pollution that relate to the non-point source categories in Section 6217. Among these regulations are the regulation for permitting agricultural facilities (R.61-43), silvacultural activities (R.6 1-9.122.27), land disturbance and erosion control (R.72-100 through 445), NPDES stormwater discharges (R.61-9.122.26 and 122.28), hazardous waste TSD activities (R.61-79), solid waste TSD activities (R.61-107), on-site domestic waste disposal activities (R.61-56; R.61-57), underground petroleum storage tanks (R.6192; R.6 1-98), aquaculture activities (R.6 1-9-122.25), mining operations (R. 89-10 *et seq.),* and others. Any permits granted under these regulations may contain management measures as necessary to abate or control pollution. The Department is empowered to enforce permit conditions and to compel compliance with the provisions of the PCA without first showing a violation of water quality standards. Finally, if the controls available to the Department at present are not sufficient to address non-point source pollution, the Department has ample authority under the PCA to craft additional regulations as necessary to authorize issuance of permits that incorporate the management measures

of Section 6217. Although the Department may prevent and control non-point source pollution in the absence of a permit, the specific authority provided in the permitting programs gives the Department more enforcement options to achieve this end.

In conclusion, the Department has broad authority to prevent and control all non-point source pollution in the State, whether such sources cause violations of water quality standards or not. Used in conjunction with the permitting regulations available to the Department, the PCA provides ample authority to enforce the non-point source requirements of 6217.

APPENDIX E

Memorandum of Understanding Between the SC Department of Health and Environmental Control and the SC Forestry Commission

MEMORANDUM OF UNDERSTANDLNG

between the

South Carolina Department of

Health & Environmental Control

and the

South Carolina

Forestry Commission

The agreement is made and entered into the first day of July 1997, by and between the S. C. Department of Health & Environmental Control (hereinafter referred to as SCDHEC) and the S. C.
Forestry Commission (hereinafter referred to as the SCFC).

WHEREAS:

1. **The SCDHEC has the responsibility under the Pollution Control Act (48-1..1O S. C. Code of Laws, 1976) to provide for public health and environmental protection by administration of a system to protect water quality.**
2. **The SCDHEC is responsible for developing and implementing the State of South Carolina Nonpoint Source Management Program pursuant to the Federal Clean Water Act (PL 100-4), Section 319 and the Coastal Zone Act Reauthorization Act, Section 6217. The program provides for the attainment of water quality objectives and for protection of beneficial uses of water through nonpoint source (NPS) control measures.**
3. **The SCFC is identified in South Carolina's Nonpoint Source Management Plan, prepared by SCDHEC, as the lead agency for the development and interpretation of forestry Best Management Practices (BMP) and is integral in the implementation of the forestry section of the NPS management plan.**
4. **The SCFC has the responsibility under the South Carolina Forest Best Management Practices Act (48-36-30) et. seq., S. C. Code of Laws, 1976 as amended) to serve as the designated agency in S. C. to provide public oversight and guidance for technical forest**

management practices and related activities in laws pertaining to forestlands.

NOW, TREREFORE, in consideration of the mutual benefits to each party hereto in promoting the Nonpoint Source Management Program for South Carolina pursuant to Section 319 of the Federal Clean Water Act and Section 6217 of the Coastal Zone Act Reauthorization Amendments,

the parties agree as follows:

1. **The SCFC shall serve as a clearinghouse for citizen concerns, suggestions, and complaints for forestry-related activities on forestland.**
2. **The SCFC shall locate specially-trained BMP Foresters in each of the SCFC's three regional offices to serve as local coordinators of the forestry BMP program.**
3. **The SCFC shall develop and revise forestry BMPs as needed, based on monitoring results, new research, and changes in state and federal laws.**
4. **The SCFC shall deve'op and present educational programs dealing with silvicultural nonpotnt source pollution problems and the implementation of forestry forestry BMPs to address those problems.**
5. **The SCFC shall develop and implement a statewide forestry BMP implernentation monitoring program to accurately track compliance with state BMPs over time. A summary report of the BMP impLementation monitoring results shall be published at the end of periodic surveys.**
6. **The SCFC shall implement a forestry BMP courtesy exam program that will focus on a proactive approach to preventing NPS pollution through the offer of courtesy exams by specially-trained BMP Foresters. Ongoing forestry activities shall be located by routinely flying the major drainages in the state.**
7. **The SCFC shall provide the SCDHEC with information concerning forestry-related activities, identified through the courtesy exam program, if the involved landowner/forestry operator has BMP deficiencies that have caused significant in-stream water quality violations.**
8. **The SCDHEC shall notify the SCFC of any circumstances where forestry activities are being conducted in a manner which may cause violations of State water quality standards so the SCFC may work with the landowner/forestry operator to prevent or correct these violations.**
9. **Nothing herein shall be construed in any way as limiting the authority of either state agency in carrying out their legal responsibilities for management or regulation of water quality.**
10. **Each and every provision of the Memorandum of Understanding is subject to the laws and regulations of the State of South Carolina and the United States.**

THIS MIMORANDUM OF TJNDERSTANDING is entered into for the purpose of coordinating implementation of the forestry component of the State's nonpoint source management plan and for ensuring that appropriate BMPs which minimize adverse effects on the State's waters are in place.

THE UNDERSIGNED accept and agree to implement the responsibilities detailed in this Memorandum of Understanding.

This agreement will become effective on the date below and shall remain in effect until terminated. It may be revised or modified at any time by mutual agreement of the parties hereto. This agreement may be terminated by either party upon 60 days written notice to the other party.

In witness whereof, the parties, hereto, have executed this agreement on this first day of July 1997.

For the South Carolina Department of Health & Environmental Control

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R. Lewis Shaw
Deputy Commissioner
Environmental Quality Control

For the South Carolina Forestry Commission

J. Hugh Ryan
State Forester